L.E. Capenter and Co.
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SUPPLEMENTAL SAMPLING PLAN L.E. CARPENTER FACILITY, WHARTON, MORRIS COUNTY, NEW JERSEY

JULY 13,1990

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SECTION 1

INTRODUCTION

L.E. Carpenter and Company has prepared the following Supplemental Sampling Plan for their L.E. Carpenter & Co. facility located in Wharton, Morris County New Jersey. The facility has most recently been used as a manufacturing and warehousing site for vinyl wall coverings. On behalf of L.E. Carpenter and Company, Weston Services, Inc. (WSI) developed this Sampling Plan to address potential areas of environmental concern associated with the facility that were not fully characterized by the initial Remedial Investigation.

WSI identified these areas of concern through the review of available information relating to the distribution of contaminants on the site, past operations at the facility and neighboring properties. In addition, WSI conducted a review of historical documents, interviews with present and former employees, a site inspection, a review of regional and site-specific geologic/hydrogeologic data, and interpretation of historical aerial photographs. In addition requests made by the NJDEP and USEPA for additional sampling were considered.

Section 2 of this Sampling Plan describes the environmental setting of the areas requiring additional sampling. Section 3 outlines the sampling and analytical procedures to be followed by WSI throughout the investigation. In addition, sampling protocols, a health and safety plan, and a schedule of activities are presented. A QAAP has been prepared for this additional sampling and is submitted as a separated document.

All activities and methods proposed in this Sampling Plan including sampling strategy, quality assurance/quality control, and health and safety guidelines are consistent with the following documents:

- Division of Hazardous Waste Management Remedial Investigation Guide (March 1990), New Jersey Department of Environmental Protection.
- Field Sampling Procedures Manual, Hazardous Waste Programs, New Jersey Department of Environmental Protection.

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SECTION 2

ENVIRONMENTAL SETTING

2.1 PROPERTY DESCRIPTION

Figure 2-1 depicts the location of the site and illustrates the general environmental setting. The site (property boundary) occupies approximately 14.6 acres northwest of the intersection of the Rockaway River and North Main Street. The site is situated within a heavily industrialized area. The Rockaway River borders the site to the south, a vacant lot lies to the east, a large compressed gas facility (Air Products Inc), borders the site to the northeast, and a residential area borders the site to the northwest. Additional industrial sites are located to the south of the site. The residential portion of the Borough of Wharton is separated by Ross Street which is located on the northwest side of the site.

The site has been active since the 1800's as an iron ore mine and, subsequently, as a manufacturing site. Prior to manufacturing, the site contained the Washington Forge and West Mount Pleasant mines. Tailings from these mines are thought to have been disposed of on site. In conjunction with the mines, a forge was operated on the site concurrent with mining. Additional details concerning past site use can be found in the Site Evaluation Submission Appendix H, ECRA Sampling Plan and the Draft Report of Remedial Investigation Findings.

A current site plan of the L.E. Carpenter facility is provided in Figure 3-1. The buildings occupy approximately 15%, of the 636,000 square foot (14.6 acre) property. The Rockaway river occupies approximately 13% of the property. A historical profile of the site and building is provided in Sections 3 and 4 of the Draft Report of Remedial Investigation Findings.

Pavement associated with the buildings and access roads occupy approximately 22% of the site. All vehicles enter the site either along North Main Street which crosses the site or at the northwest property entrance along Ross Street. The site is enclosed by a security fence except along the Rockaway River and the small section of the property between Washington Forge Pond and North Main Street which is used as a parking lot for building 2. Security gates are present at the fenced entrances to the majority of the property.

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FIGURE 2-1 SITE LOCATION AND TOPOGRAPHIC MAP

2.1.1 Aerial Photograph Review

To assist in locating the area of the former impoundment, and the clarification of environmental concerns associated with test pits TP-2, TP-3, TP-50 and drums encountered during excavation of TP-4, TP-5 and TP-23, WSI reviewed aerial photographs taken in 1959, 1963, and 1974. These aerial photographs depict general conditions at the site and surrounding area. No evidence of drum disposal was detected in the aerial photograph review.

2.2 TOPOGRAPHY AND DRAINAGE

Figure 2-1 depicts the topography in the vicinity of the L.E. Carpenter facility at a 20 foot contour interval. In general, the topography in the vicinity of the L.E. Carpenter site slopes east-southeast, towards the Rockaway River. The L.E. Carpenter site lies approximately six hundred and thirty feet above mean sea level.

2.3 HYDROLOGY, GEOLOGY, AND HYDROGEOLOGY

Available data on the regional geology, hydrogeology, hydrology and soils were reviewed to characterize the physical nature of the L.E. Carpenter property and surrounding area.

In addition, results of soil investigations conducted at the site in 1989 as part of the Remedial Investigation were reviewed. A total of seventy seven (77) test pits were excavated and eleven (11) borings associated with monitor well and piezometer installation were drilled throughout the site during the Remedial Investigation.

This data can be found in the Draft Report of Remedial Investigation Findings and the Site Evaluation Submission Appendix H, ECRA Sampling Plan.

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SECTION 3

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

3.1 INTRODUCTION

Based on a review of the Report of Remedial Investigation finding and other historical documents, interviews with present and former employees, a site inspection, review of geologic/hydrogeologic data in the vicinity, and the interpretation of historical aerial photographs, four (4) areas of environmental concern (AEC) have been identified at the L.E. Carpenter facility.

The following subsections describe each specific area of environmental concern. For those areas where further investigation is justified, the intended sampling strategy, methods of sample collection, and analytical parameters are presented. Sampling procedures for each method of sample collection are presented in Section 4. Table 3-1 provides a summary of sampling activities conducted previously at each of the AECs. Table 3-2 provides a summary of proposed additional sampling activity.

3.2 STARCH DRYING BED - SUBSURFACE DISPOSAL SYSTEM

3.2.1 Overview

Between 1962 and 1972, cotton fabric brought to the site for use in the manufacture of vinyl wallcoverings was initially subjected to a process called "desizing". This was performed to remove any impurities that would cause imperfections to develop during the subsequent manufacturing processes.

Desizing involved the application of very hot water to the cotton fabric to bleach any cotton seeds or other impurities to prevent them from staining the fabric during the ensuing processes. The hot water also served to remove most of the starch used to hold the cotton fabric together; some starch remained in the fabric to give it stability until it was later coated.

Subsequent to the washdown of the fabric, the hot water, now mixed with starch and other cotton-related impurities, was collected in the desizing waste tank just north of Building #8. From there it was pumped to the subsurface disposal beds

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TABLE 3-1

SUMMARY OF PREVIOUS SAMPLING ACTIVITIES
L.E. CARPENTER AND COMPANY
WHARTON FACILITY

Location	Sample #	Matrix	Sample Depth	Analytical Parameters
STARCH DRYING BEDS - SUBSURFACE DISPOSAL SYSTEM				
AEC-A	TP-50a	Soil	0'-.5'	PP +40
	TP-50b	Soil	3'-3.5'	PP +40
	TP-51a	Soil	0'-.5'	PP +40
	TP-51b	Soil	3.5'-4'	PP +40
AEC-B	TP-2	Soil	0'-.5'	VO +10, BN +10, PCB's, PP metals
	TP-2	Soil	1.5'-2'	VO +10, BN +10, PCB's, PP metals
	TP-3	Soil	0'-.5'	VO +10, BN +10, PCB's, PP metals
	TP-3	Soil	4.5'-5'	VO +10, BN +10, PCB's, PP metals
DRAINAGE DITCH				
AEC-C	SW5	Water	surface	VO +10, BN +10, PP metals
	SS5	Sediment	surface	VO +10, BN +10, PP metals

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Table 3-2
Summary of Supplemental Sampling

Sample Identifier	Media	Analytes
P080A	Soil	PCB
P080B	Soil	PCB
P080C	Soil	PCB
P081A	Soil	PCB
P081B	Soil	PCB
P081C	Soil	PCB
P082A	Soil	PCB
P082B	Soil	PCB
P082C	Soil	PCB
P083A	Soil	PCB, VO +10, BN +10
P083B	Soil	PCB, VO +10, BN +10
P083C	Soil	PCB, VO +10, BN +10
P084A	Soil	PCB, VO +10, BN +10
P084B	Soil	PCB, VO +10, BN +10
P084C	Soil	PCB, VO +10, BN +10
P085A	Soil	PCB, VO +10, BN +10
P085B	Soil	PCB, VO +10, BN +10
P085C	Soil	PCB, VO +10, BN +10
P086A	Soil	PCB, VO +10, BN +10
P086B	Soil	PCB, VO +10, BN +10
P086C	Soil	PCB, VO +10, BN +10
P087A	Soil	PCB, VO +10, BN +10
P087B	Soil	PCB, VO +10, BN +10
P087C	Soil	PCB, VO +10, BN +10
P088A	Soil	PCB, VO +10, BN +10
P088B	Soil	PCB, VO +10, BN +10
P088C	Soil	PCB, VO +10, BN +10
P089	Soil	PP metals, VO +10
P090	Soil	PP metals, VO +10
P091	Soil	PP metals, VO +10
S007	Sediment	VO +10, BN +10, PCB
R007	Water	VO +10, BN +10, PCB
S008	Sediment	VO +10
R008	Water	VO +10
S009	Sediment	VO +10, BN +10, PCB
R009	Water	VO +10, BN +10, PCB
S010	Sediment	VO +10, BN +10, TAL metals
R010	Water	VO +10, BN +10, TAL metals

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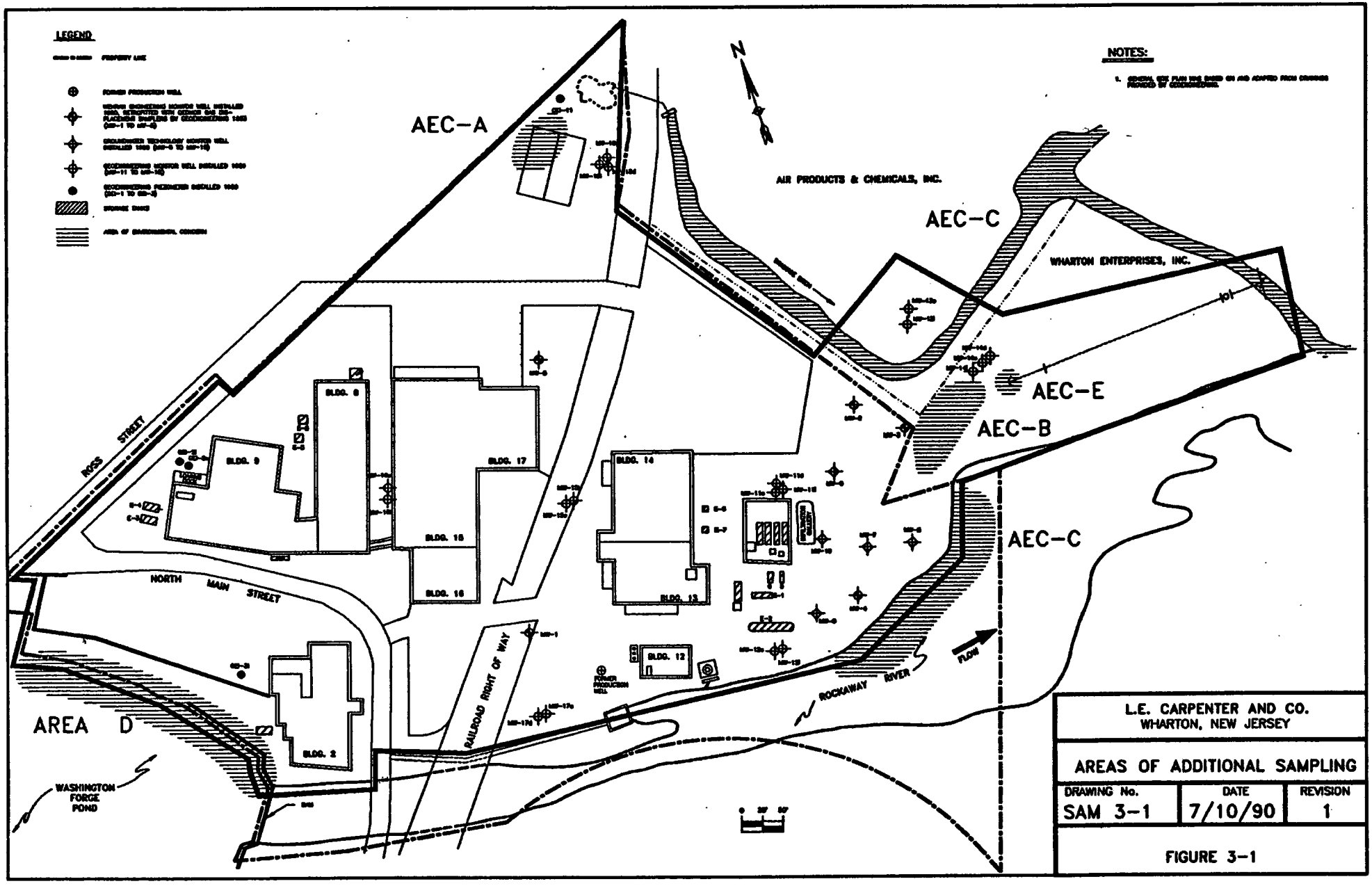

to the northeast where the mixture was subjected to microbial activity to remove the starch. The New Jersey Department of Environmental Protection granted a permit to L.E. Carpenter for discharge of effluent from this process.

The procedure was discontinued when L.E. Carpenter officials decided that it would be more economical and efficient to perform the desizing at another facility. In addition, the flow of starch waste to the beds was not great enough for the designed degradation process. This caused a foul odor in the area, to which the neighbors objected. Based on the two reasons, L.E. Carpenter voluntarily ceased using the procedure.

Two test pits were constructed during the Remedial Investigation to assess the potential contamination arising from the waste disposal in the beds. One test pit, TP-50, showed polychlorinated Biphenyl (PCB) concentrations up to 2.9 mg/kg.

3.2.2 Proposed Action

To characterize the lateral and vertical extent of PCB contamination, a total of nine (9) soil samples will be collected for analysis. Figure 3-2 shows the proposed sample locations and designations. The samples will be collected from soil borings or backhoe excavation at three locations surrounding the initial sampling location at depths of 0-6", 18" to 24" and, 42"-48" below the surface. The horizontal locations for the proposed samples are within twenty feet of the original location containing PCB's in excess of 1 mg/kg. The three soil sample horizontal locations are intended to maximize the cost effectiveness of the data collection. All samples will be analyzed for PCB's.

3.3 SLUDGE IMPOUNDMENT AREA (AEC-B)

3.3.1 Overview

The original test pits TP-2 and TP-3 (Figure 3-3) were constructed as part of the sampling effort to characterize the lateral and vertical extent of priority pollutant metals, base neutral organics and PCB contamination potentially associated with the former sludge impoundment area. According to the ACO, PCB's were not detected in samples of the sludge material collected by NJDEP 8/18/1980 and L.E. Carpenter 7/25/1979. Soil samples from TP-2 and TP-3 indicate that the Aroclor 1254 were detected at levels that exceed the DEP recommended action levels. Groundwater samples obtained by the NJDEP on 18 August 1980 from monitor wells located on the property showed a PCB concentration of 135 ppm and 16.8 ppm. Subsequent sampling of the monitor wells have not detected the presence of PCB's in the groundwater. Samples collected from the monitor wells during the first and second sampling rounds of the Remedial investigation did not detect the presence of PCB's. The groundwater data demonstrate that the PCB contamination is presently confined to soils.

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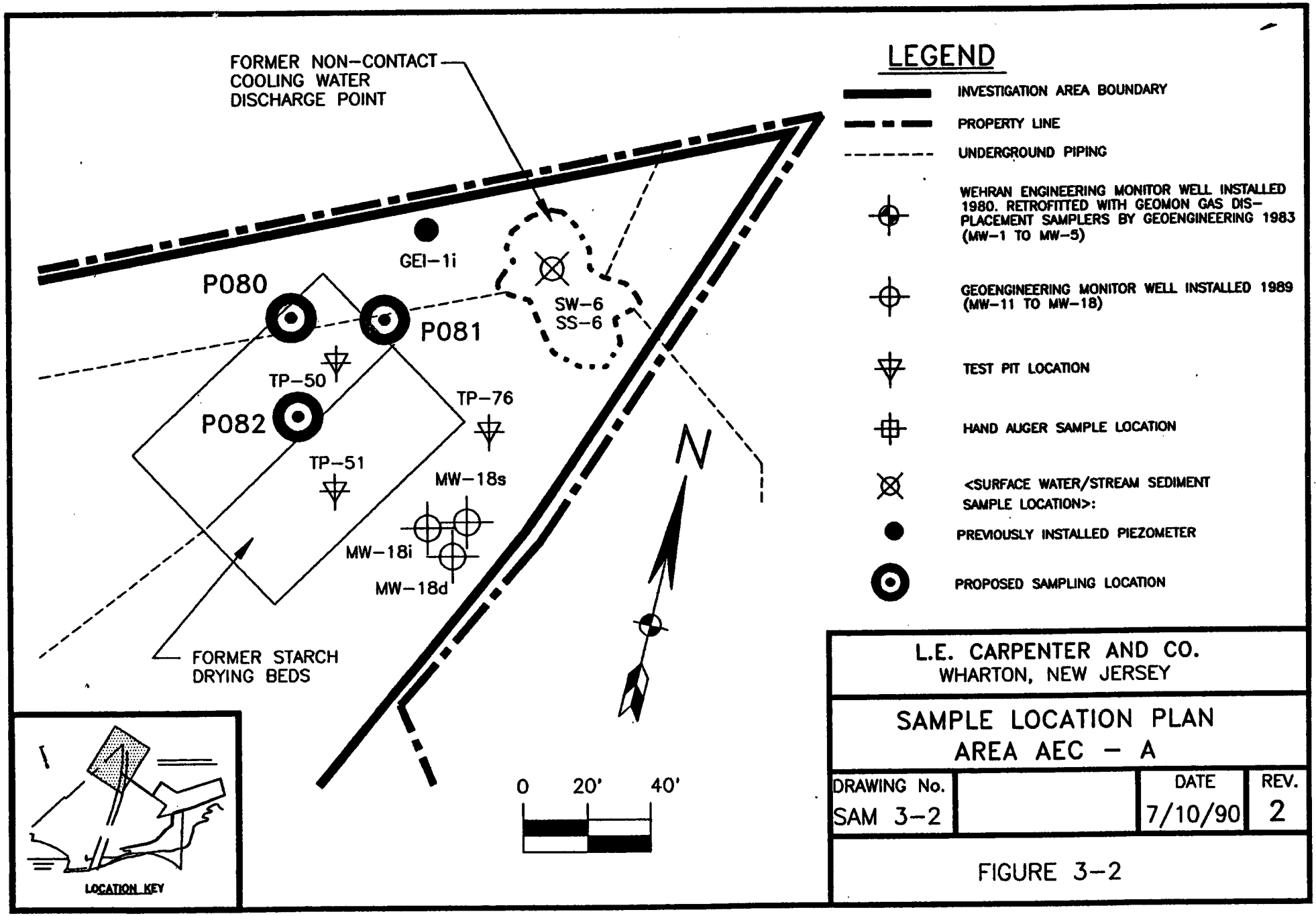

LEGEND

- INVESTIGATION AREA BOUNDARY
- PROPERTY LINE
- UNDERGROUND PIPING
- WEHRAN ENGINEERING MONITOR WELL INSTALLED 1980. RETROFITTED WITH GEOMON GAS DISPLACEMENT SAMPLERS BY GEOENGINEERING 1983 (MW-1 TO MW-5)
- GEOENGINEERING MONITOR WELL INSTALLED 1989 (MW-11 TO MW-18)
- TEST PIT LOCATION
- HAND AUGER SAMPLE LOCATION
- <SURFACE WATER/STREAM SEDIMENT SAMPLE LOCATION>:
- PREVIOUSLY INSTALLED PIEZOMETER
- PROPOSED SAMPLING LOCATION

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WHARTON, NEW JERSEY

SAMPLE LOCATION PLAN
AREA AEC - A

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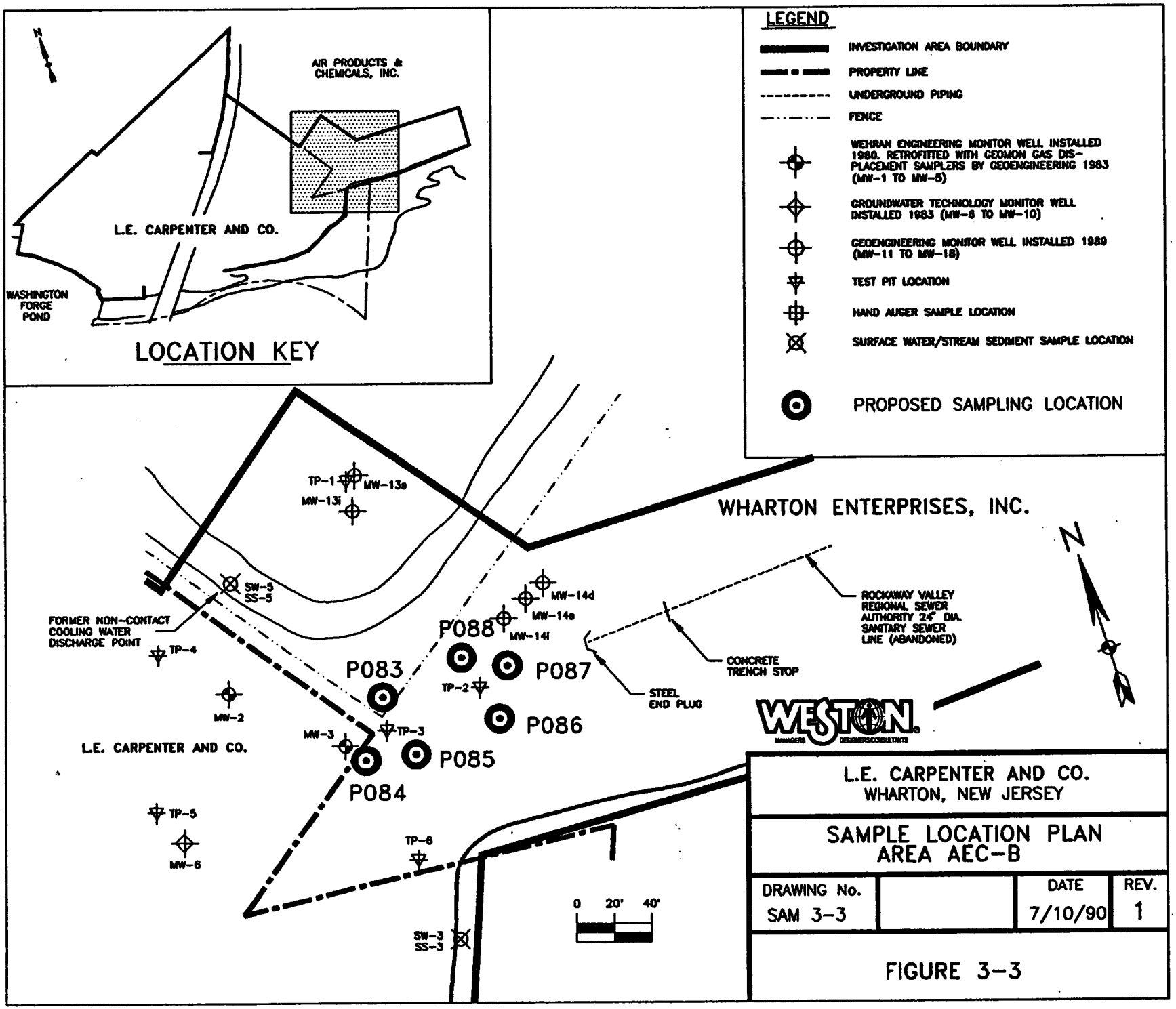
FIGURE 3-2


LEGEND
INVESTIGATION AREA BOUNDARY
PROPERTY LINE
UNDERGROUND PIPING
FENCE
WEHRAN ENGINEERING MONITOR WELL INSTALLED 1980. RETROFITTED WITH GEOMON GAS DISPLACEMENT SAMPLERS BY GEOENGINEERING 1983 (MW-1 TO MW-5)
GROUNDWATER TECHNOLOGY MONITOR WELL INSTALLED 1983 (MW-6 TO MW-10)
GEOENGINEERING MONITOR WELL INSTALLED 1989 (MW-11 TO MW-18)
TEST PIT LOCATION
HAND AUGER SAMPLE LOCATION
SURFACE WATER/STREAM SEDIMENT SAMPLE LOCATION
PROPOSED SAMPLING LOCATION
AIR PRODUCTS & CHEMICALS, INC.
L.E. CARPENTER AND CO.
WASHINGTON FORGE POND
LOCATION KEY
WHARTON ENTERPRISES, INC.
TP-1
MW-13s
MW-13i
SW-3
SS-5
FORMER NON-CONTACT COOLING WATER DISCHARGE POINT
TP-4
MW-2
MW-3
TP-3
TP-2
MW-14d
MW-14s
MW-14i
P088
P083
P087
P086
P085
P084
ROCKAWAY VALLEY REGIONAL SEWER AUTHORITY 24" DIA. SANITARY SEWER LINE (ABANDONED)
CONCRETE TRENCH STOP
STEEL END PLUG
L.E. CARPENTER AND CO.
TP-5
MW-6
TP-6
SW-3
SS-3
0 20' 40'
N
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L.E. CARPENTER AND CO.
WHARTON, NEW JERSEY
SAMPLE LOCATION PLAN
AREA AEC-B
DRAWING No.
SAM 3-3
DATE
7/10/90
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1
FIGURE 3-3

The property boundary presented in the Draft Report of Remedial Investigation Findings show that these two test pits are located off the L.E. Carpenter property. Historical aerial photograph review suggests that the test pit locations are outside of the area of the sludge impoundment. Areas of potential sludge impoundment are shown in Figure 3-4. Aerial photographs suggest a powerline may have existed over the area where the test pits were constructed. This interpretation is supported by a Rockaway Valley Regional Sewerage Authority diagram clearly showing utility poles along the now abandoned sewer line which would cross the area of the two test pits. Diagrams associated with the Rockaway Valley Sewer plans shows an oil spill area steming from this power line right-of-way. These factors suggest that the PCB contamination is not associated with the disposal of sludge at the Impoundment and further supports the conclusion that PCB contamination is presently confined to the soils.

3.3.2 Proposed Action

To characterize the lateral and vertical extent of PCB, BN and VO contamination in the vicinity of TP2 and TP3 a total of eighteen (18) soil samples will be collected for analysis. Figure 3-3 shows the proposed sample locations and designations. The samples will be collected from soil borings or backhoe excavation at three locations surrounding the initial sampling location at depths of 0-6", 18" to 24"and 42"-48" below the surface. The horizontal locations for the proposed samples are located 20 feet from the original location containing PCB's in excess of 1 mg/kg. The three soil sample horizontal locations are intended to maximize the cost effectiveness of the data collection and produce data that will achieve the characterization goal. Samples will be analyzed for VO +10, BN +10, and PCB's.

3.4 AIR PRODUCTS DRAINAGE DITCH - ROCKAWAY RIVER (AEC-C)

3.4.1 Overview

A drainage ditch which follows the approximate property boundary between Air Products & Chemical Inc. and the L.E.Carpenter Site receives sheet runoff from a limited area of the L.E. Carpenter site immediately adjacent to the ditch. In addition drainage from several paved areas of the site discharge to a storm sewer that discharges to this drainage ditch. The drainage ditch is postulated to be, in part, recharged by groundwater that flows beneath the L.E. Carpenter site. Non contact cooling water has been allowed in the past to discharge to the drainage ditch. Samples of surface water and sediments from the ditch were obtained from immediately downgradient of the former non-contact cooling water discharge point during the first round of sampling conducted under the Remedial Investigation.

Additional characterization of the stream water quality is needed to assess the potential impact of the drainage ditch water on the Rockaway River.

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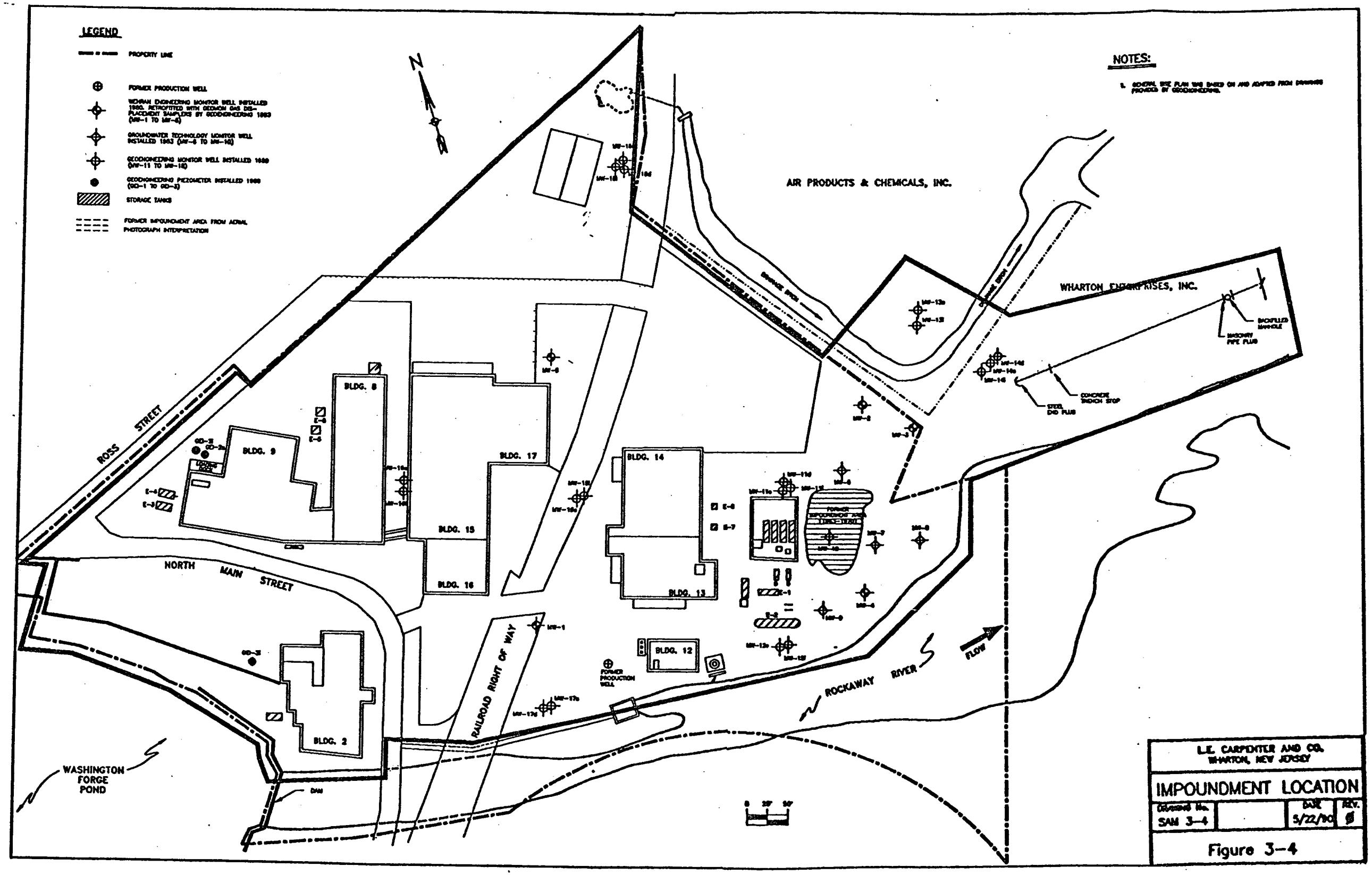

3.4.2 Proposed Action

Three sediment and three surface water samples will be collected from discrete points along the drainage ditch as shown in Figure 3-5. One sediment and one surface water sample will be collected at the Rockaway River directly South of MW 4 to assess the extent of potential contaminant discharge to the river. One sample will be collected at the confluence of the Rockaway River and the drainage ditch. This sample will be collected to assess the impact of the drainage ditch on the Rockaway River. One sample will be collected after the bend in the drainage ditch to assess potential impact from the L.E. Carpenter site on the drainage ditch downgradient of the site boundary. One sample will be obtained from the outfall area of the former non-contact cooling water drain to assess the impact of the outfall and the nearby starch drying beds. This upgradient sample will also be collected to determine background quality of the ditch surface water and sediment.

All samples in AEC-C will be analyzed for VOC. In addition, the sample of the head of the drainage ditch adjacent to Area ACE-A will be analyzed for VOC +10, BN +10 and PCB's to characterize the drainage ditch at its head. The samples obtained at the confluence of the Rockaway River and the drainage ditch will be analyzed for VOC +10, BN +10 and PCBs. The rational for the samples are summarized in table 3-3.

3.5 BACKGROUND SOIL SAMPLING - AEC-D

The L.E. Carpenter site is believed to be constructed on fill materials. To assess background quality in the area of the site, three soil samples will be collected from the area east of the site along Washington Pond (Figure 3-6) away from the site's former manufacturing areas. The samples will be collected from the surface to 1.0 feet and will be analyzed for PP metals and VOC+10. Once the site's background has been established, they will be used for a statistical comparison with site soil samples.

3.6 ABANDONED SEWER LINE - AEC-E

The abandoned Rockaway Valley Sewerage Authority sewer line that is in close proximity to monitor well cluster 14 has been proposed for additional sampling by the NJDEP. Upon close examination of the variation in lithology of the soils and sediment that underlie the L.E. Carpenter site and the adjacent property additional sampling is not proposed. The following rational was used in the justification of this decision.

The ability of fluids to flow through a soil or sediment media is controlled by the distribution of permeable conduits within the media. Permeability is influenced by several factors of which the most important are grain size and sorting.

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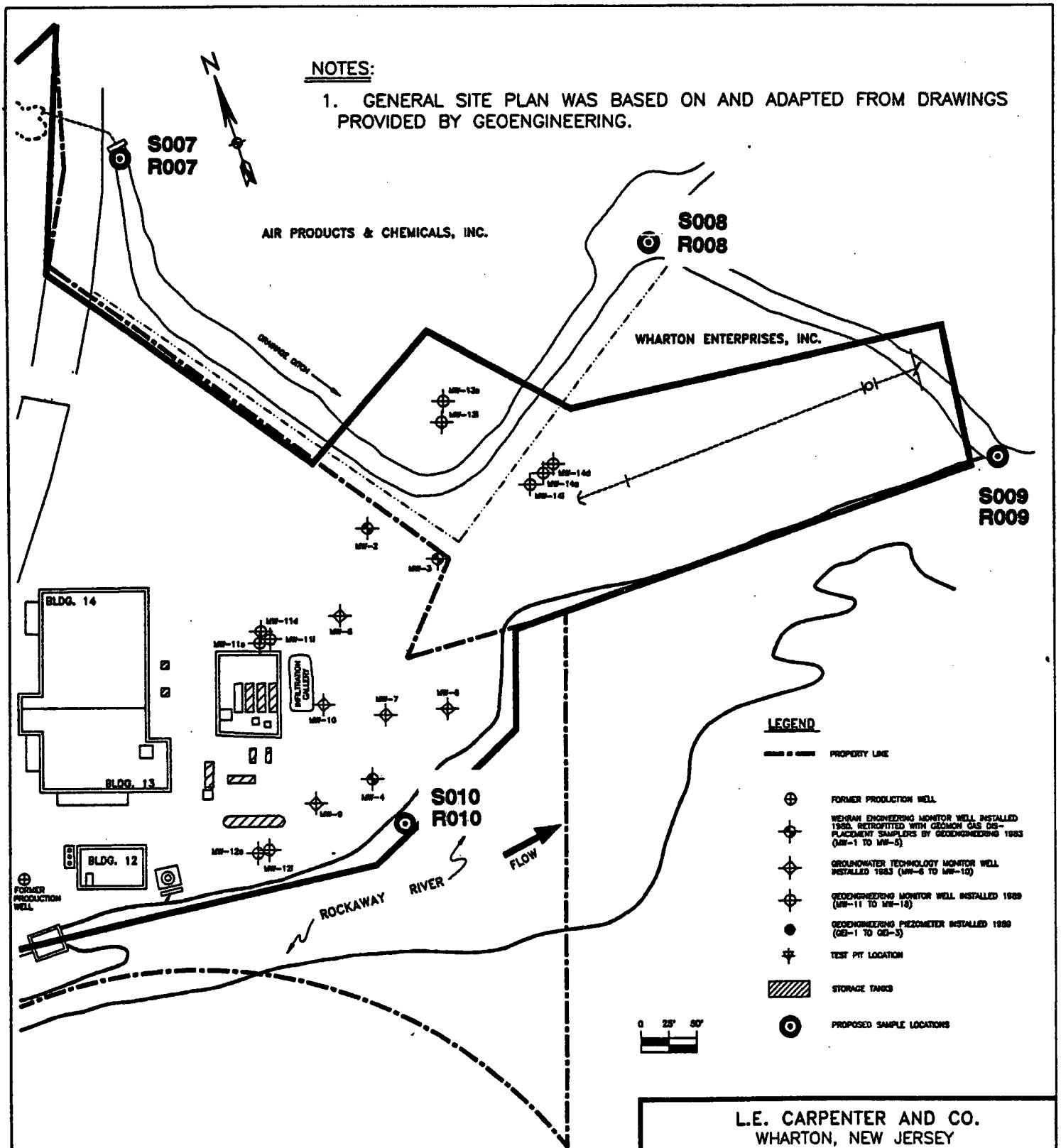

L.E. CARPENTER AND CO. WHARTON, NEW JERSEY		
AREA AEC-C		
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FIGURE 3-5		

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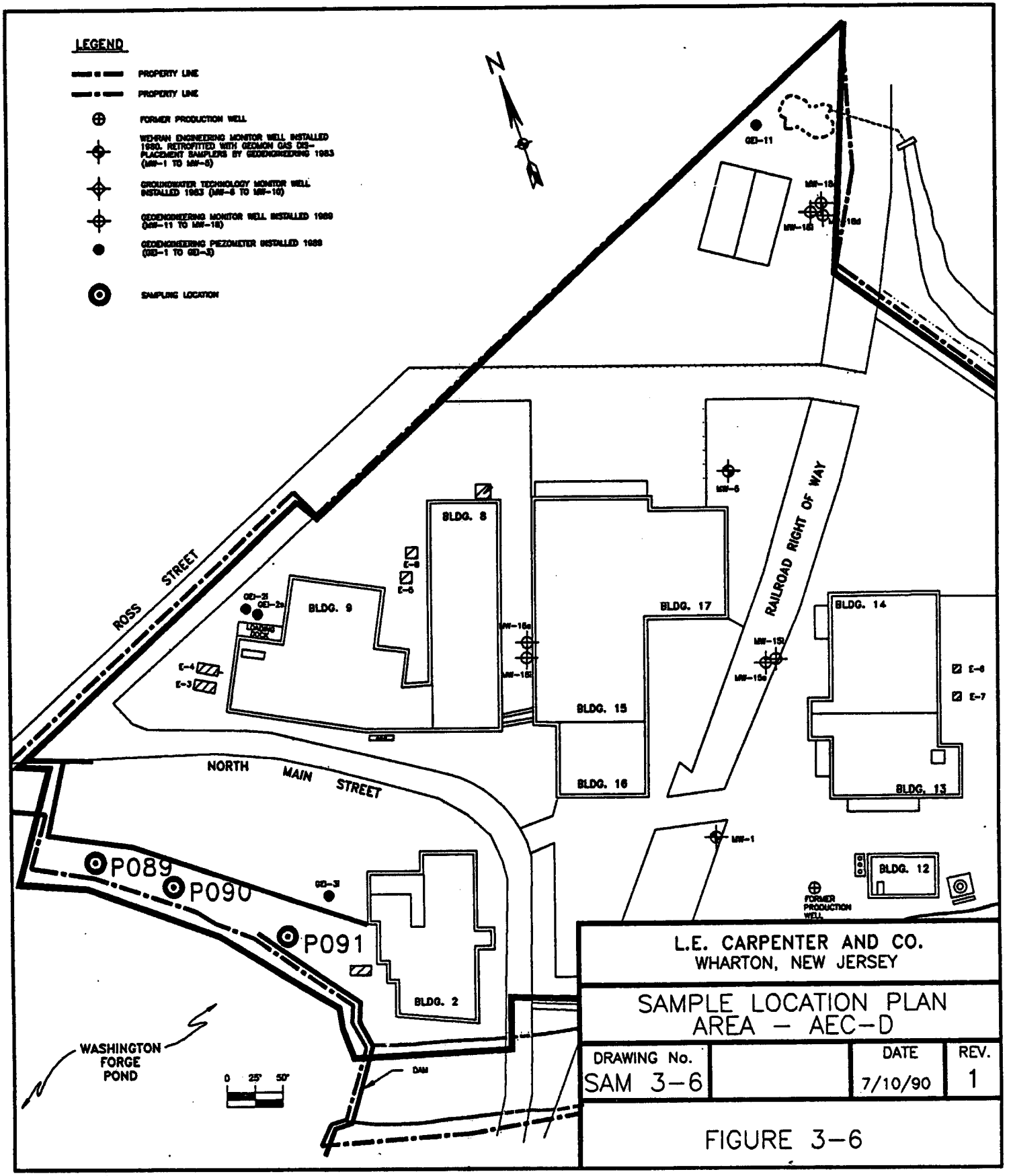

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SAMPLE LOCATION PLAN
AREA – AEC-D

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FIGURE 3-6

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Table 3-3

Rational for Supplemental Surface Water and Sediment Sampling

Location	Rational	Analytical Parameters
Former Outfall from Starch Beds to Ditch	Assess migration of Contaminants from Starch Bed Operations	VOC +10, BN +10, PCB
Junction of Ditch and Rockaway River	Assess Impact of Ditch on River Quality	VOC +10, BN +10, PCB
Bend in Drainage Ditch	Assess Down gradient Quality of Ditch	VOC +10
Rockaway River South of MW4	Assess Impact of Site Contaminants on Rockaway River	VO +10, BN +10, PCB

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These parameters have been consistently described in the previous investigations conducted on the site extensive soil borings and monitor wells.

Using the soil descriptions, a number can be assigned to the soil type present within one foot of the groundwater table that reflects a relative permeability on a scale of zero to ten. Impermeable plastic clay is assigned a value of 0 and the coarse well sorted gravels a value of 10. A map of the soil types near the water table can be constructed and used as a depiction of relative permeability distribution. The map constructed in this method is shown in Figure 3-7. The areas of lower permeability are shown on this map as a hatched area. Extrapolation between data points are based on stocastic sedimentological modeling and incorporates the predictability of depositional environments as described in the large quantity of literature concerning fluvial depositional environments. The degree of variability found on the site has also been incorporated into the presentation.

The fluids that flow through the sediments and soils on the site encounter the distribution of relative permeability and the flow of fluid is affected. Fluid flow will be preferential through the high permeability zones. Flow of floating contaminants will be similarly preferential through zones of higher permeability. The effect of the distribution of relative permeability can be observed in the immediated area of the tank farm. The tank farm area contains a high density of test pits. In this area adjacent test pits showed little or no free product contamination at the water table samples on one pit and the adjacent test pit had obvious floating product contamination. Close examination of the lithologic description indicate that the noncontaminated test pit sample was obtained from a lower permeability type lithology. The changes in lithology are illustrated on cross section A-A and B-B (Figure 3-8, Figure 3-9).

Based on the distribution of lithologies, which incorporates the fluvial deposition model, and the known distribution of floating contaminants on the site, WSI believes that, due to documented low permeability soil and sediment present in the area of monitor well cluster 14, the sewer line is physically separate from the contaminants present in the L.E. Carpenter site at the level of the water table.

3.6.1 Proposed Action

At the request of NJDEP a soil sample will be taken at the 18 to 20 inch depth and 6 inches below the base of the sewer line or immediately above groundwater if encountered. These samples will be analyzed for PCB's VO +10 and BN +10. The sample location is shown in Fig 3-10.

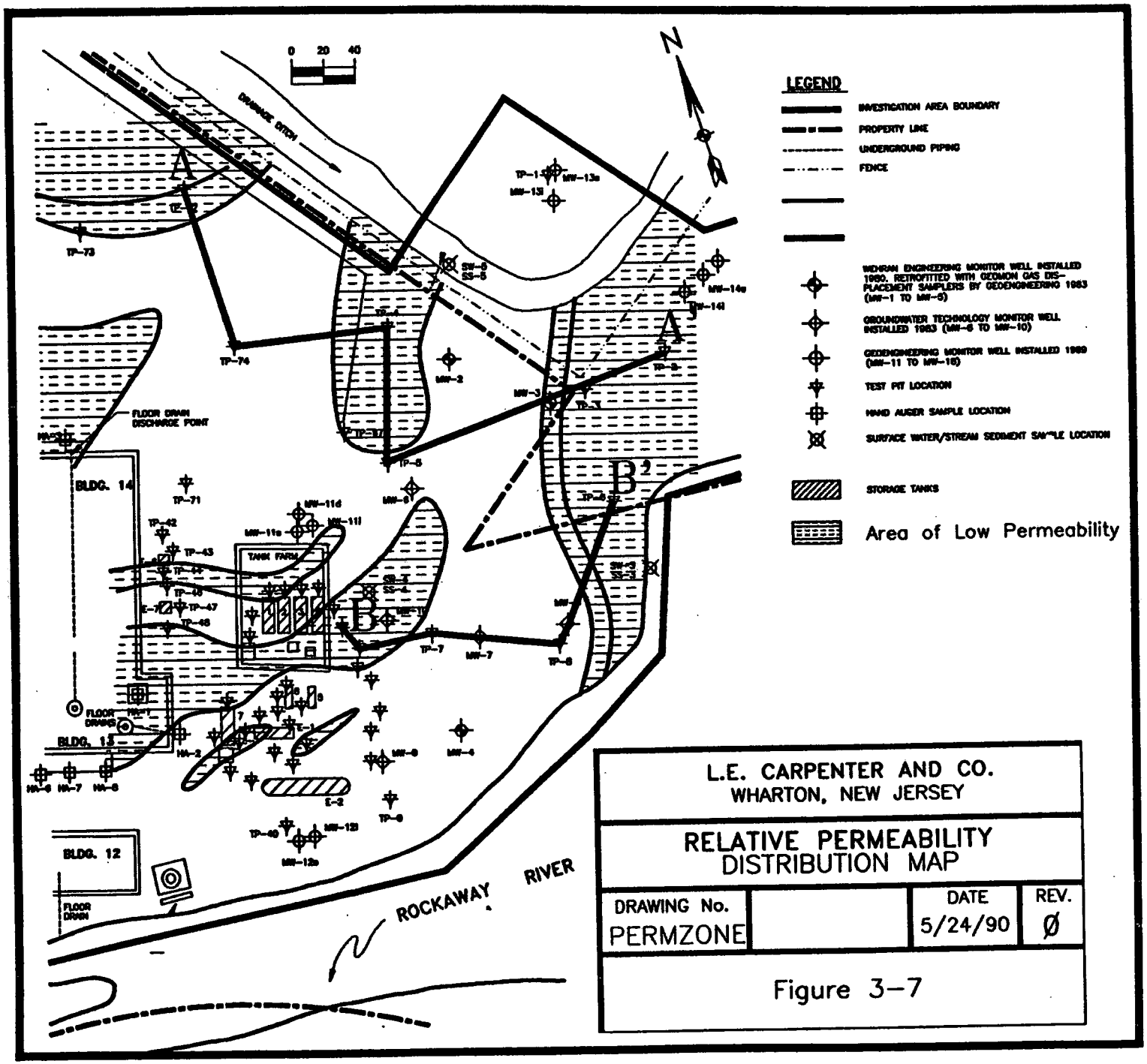
0 20 40
N
DRAINAGE DITCH
LEGEND
INVESTIGATION AREA BOUNDARY
PROPERTY LINE
UNDERGROUND PIPING
FENCE
WEHRAN ENGINEERING MONITOR WELL INSTALLED 1980. RETROFITTED WITH GEOMON GAS DISPLACEMENT SAMPLERS BY GEOENGINEERING 1983 (MW-1 TO MW-5)
GROUNDWATER TECHNOLOGY MONITOR WELL INSTALLED 1983 (MW-6 TO MW-10)
GEOENGINEERING MONITOR WELL INSTALLED 1989 (MW-11 TO MW-16)
TEST PIT LOCATION
HAND AUGER SAMPLE LOCATION
SURFACE WATER/STREAM SEDIMENT SAMPLE LOCATION
STORAGE TANKS
Area of Low Permeability
FLOOR DRAIN DISCHARGE POINT
BLDG. 14
BLDG. 15
BLDG. 12
TANK FARM
FLOOR DRAIN
ROCKAWAY RIVER
A
B
A'
B'
L.E. CARPENTER AND CO.
WHARTON, NEW JERSEY
RELATIVE PERMEABILITY DISTRIBUTION MAP
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Figure 3-7

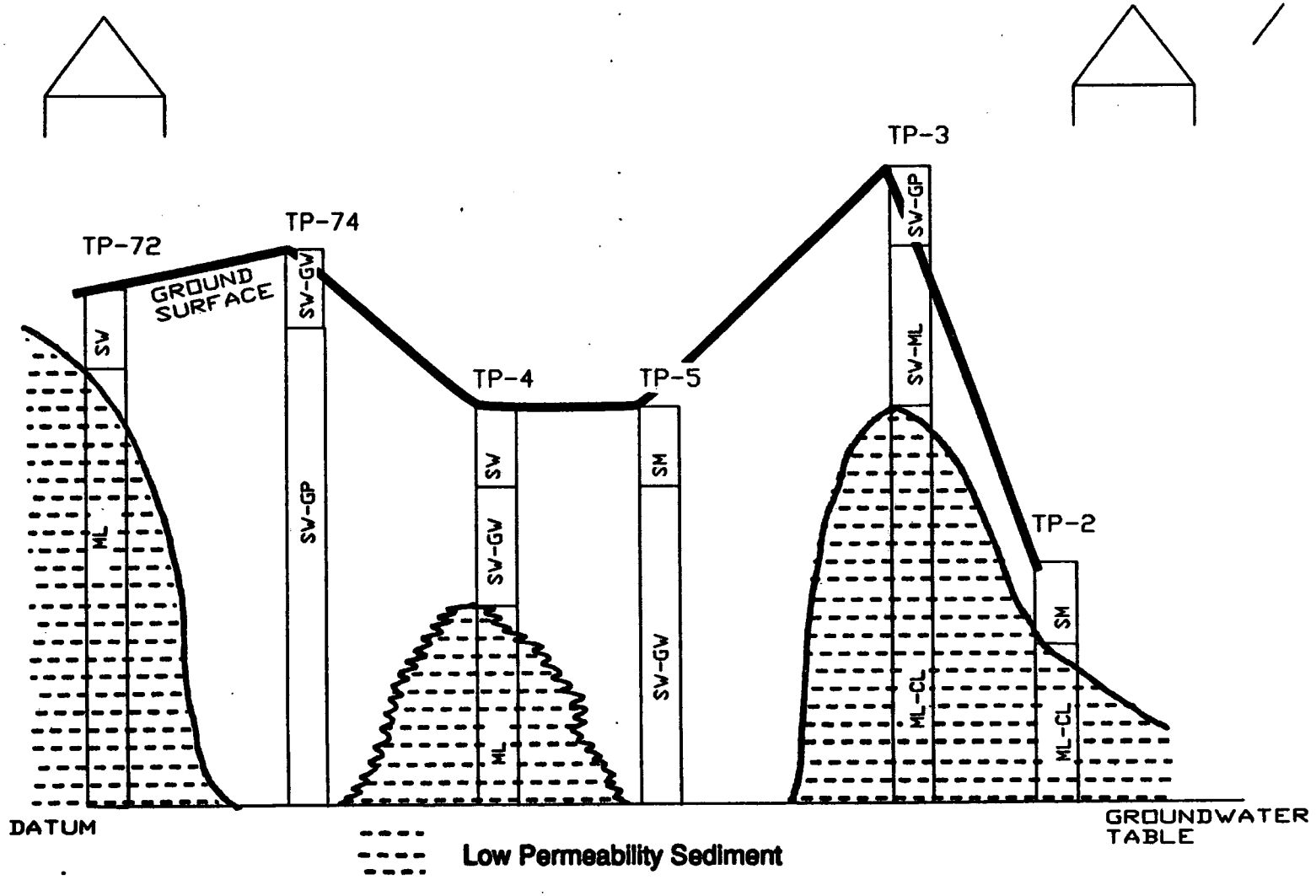

FIGURE 3-8 Cross Section A-A'

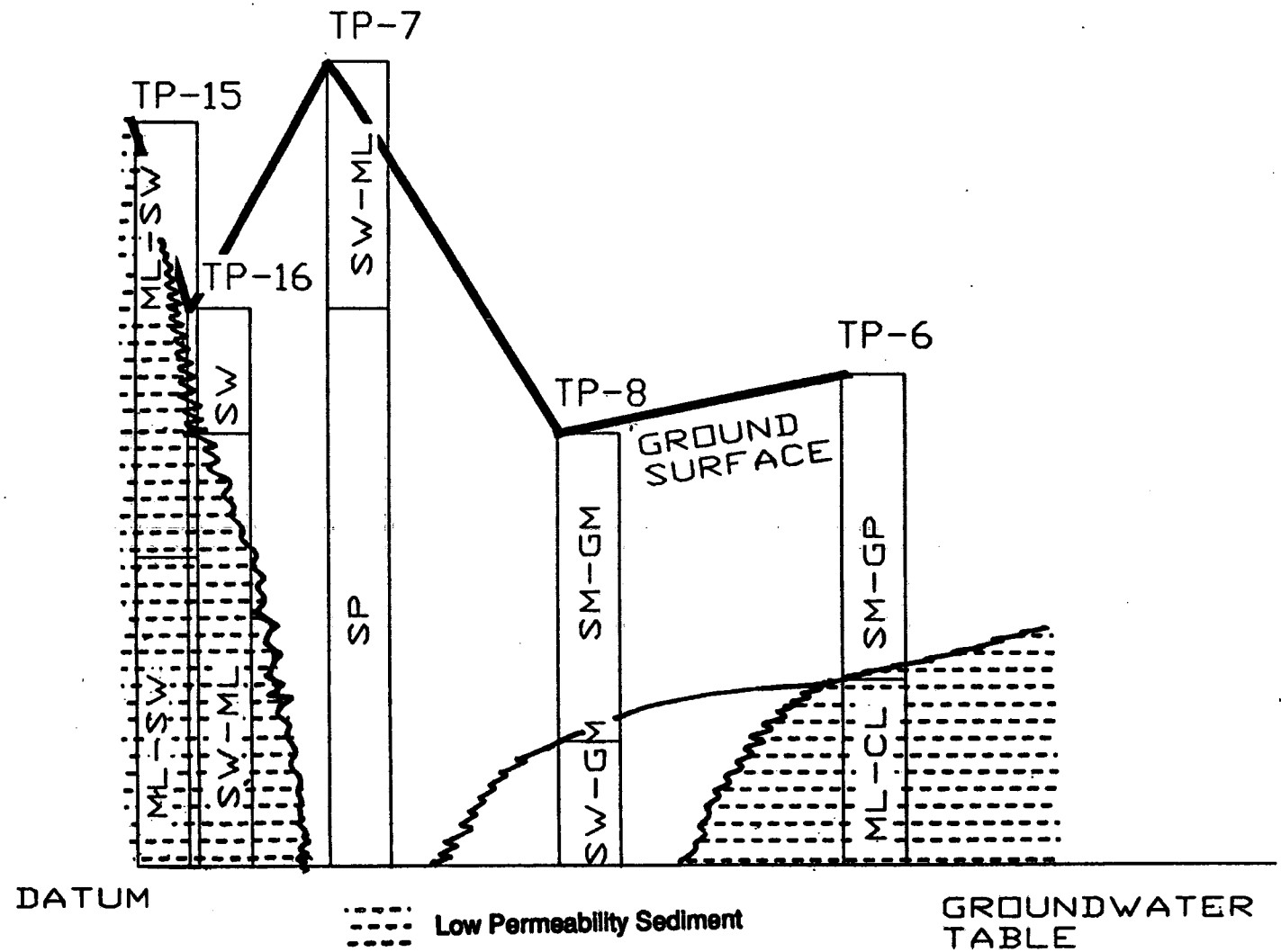

FIGURE 3-9 Cross Section B-B'

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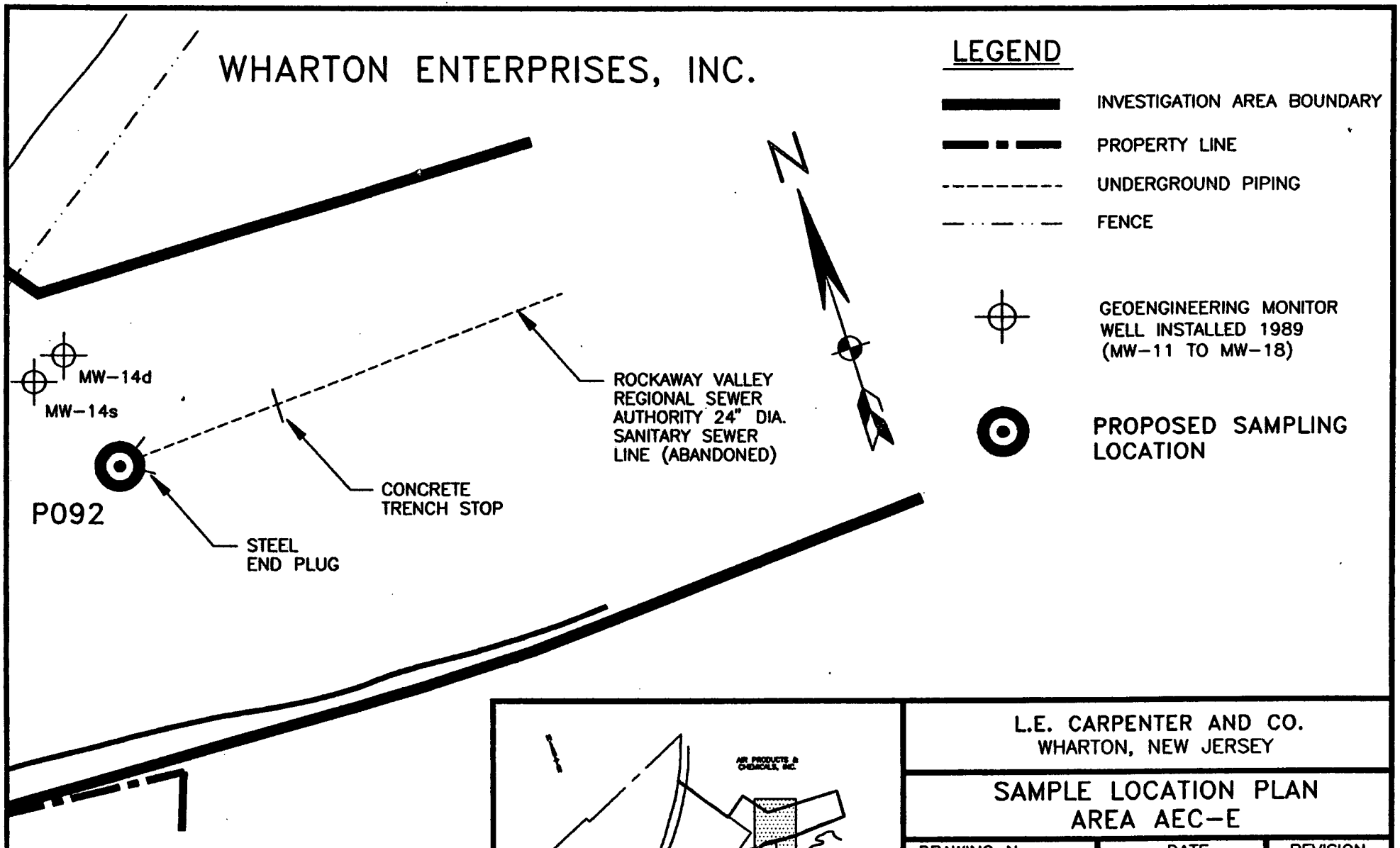
WHARTON ENTERPRISES, INC.



LEGEND

- INVESTIGATION AREA BOUNDARY
- PROPERTY LINE
- UNDERGROUND PIPING
- FENCE
- GEOENGINEERING MONITOR WELL INSTALLED 1989 (MW-11 TO MW-18)
- PROPOSED SAMPLING LOCATION

LOCATION KEY

L.E. CARPENTER AND CO.
WHARTON, NEW JERSEY

SAMPLE LOCATION PLAN
AREA AEC-E

DRAWING No.	DATE	REVISION
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FIGURE 3-10

SECTION 4

SAMPLING AND ANALYSIS PROTOCOLS

4.1 INTRODUCTION

To assure the validity of the field activities, data analysis, and laboratory analyses the procedures described in this section will be employed throughout the execution of this sampling and analysis plan. These sampling and analysis protocols were developed in accordance with the NJDEP, Bureau of Environmental Measurements and Quality Assurance "Field Sampling Procedures Manual" (2/88).

4.2 SITE-SPECIFIC FIELD PROCEDURES

To complete the sampling activities outlined in Section 3 the following specific sampling procedures will be performed:

- Soil Borings and Split Spoon Sampling
- Backhoe pit excavation
- Surface water Sampling

4.2.1 Soil Borings and Sampling Backhoe Pit Excavation

All drilling activities at the site will be performed by a New Jersey-licensed driller and will be accomplished using standard hollow stem, augering methodologies. Soil boring samples will be collected using split spoon samplers in accordance with standard soil sampling methods (ASTM Method D-1586-67/84). Split spoon samples will be collected continuously in the undisturbed soils ahead of the auger. A decontaminated split spoon will be used for each successive interval sampled. The recovered sampler will be opened and will be screened with the HNu PID and described by a qualified WSI geologist. This procedure will be performed for all split spoon samples collected.

Due to the presence of boulders in the shallow soil, split-spoon sampling and hollow stem augering techniques may not succeed. If, in the opinion of WSI's Geoscience staff, the standard soil boring methods are not applicable to the site, soil samples shall be collected by hand augering 6" from the surface exposed by a backhoe excavator. All equipment used in this procedure shall be considered sampling equipment and decontaminated prior to use.

If the groundwater interface is encountered during drilling, then the borehole will be sealed to the surface with a mixture of five pounds of bentonite per 94 pound

bag of cement, dry mixed and added to eight gallons of water.

4.2.2 Surface Water Sampling

Surface water sampling will be conducted contemporaneous to soil sampling. All sampling equipment will be decontaminated as described in Section 4.4. A laboratory-cleaned teflon bailer lowered with a teflon-coated stainless steel cable will be used to collect the water samples. Water samples will be carefully transferred from the bailer to the sample bottles to minimize the potential for aeration. All samples designated for volatile organics analysis will be collected first. If a bailer proves to be too long for adequate sampling, a laboratory decontaminated 1 liter bottle will be used to collect the surface water. Water from this bottle will be poured into the sample bottle to be sent to the laboratory for analysis. This sampling bottle will be used for only one location.

4.3 GENERAL SAMPLING PROCEDURES

4.3.1 Documentation

All data collection activities performed at the site will be documented in a bound field notebook. During drilling activities the field team member supervising a rig will keep a chronologic log of drilling activities, other pertinent excavation information (staining, odors, field screening, atmospheric measurements, geotechnical data), and a labor and materials accounting in the field notebook. All soils encountered during sampling will be logged by a qualified WSI geologist according to the soil type, appearance, and other distinguishing features. Soils will be described following the Unified Soil Classification System. A copy of a sample test boring log form is shown in Figure 4-2.

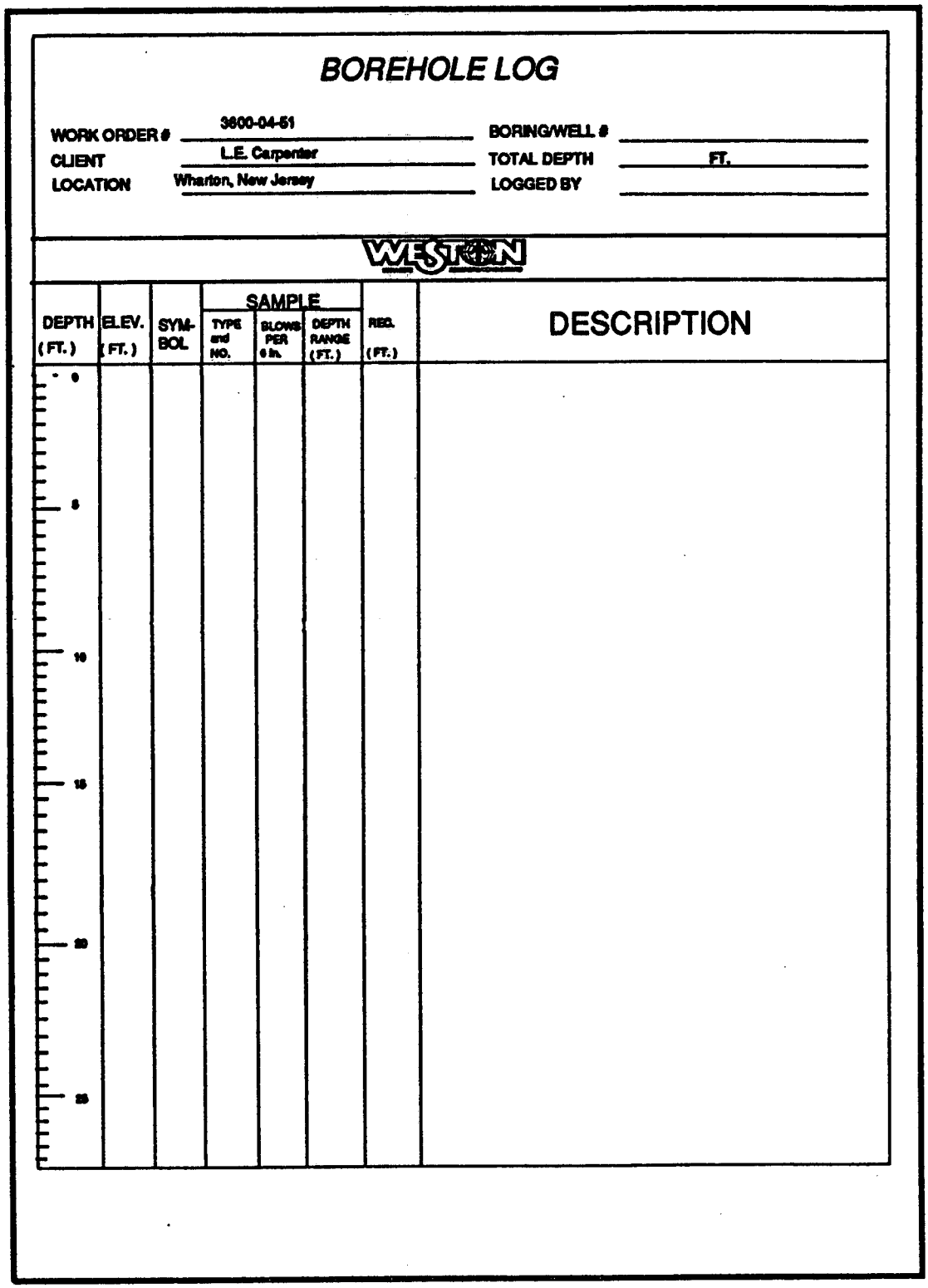
To the extent practical, sampling locations will be photographed to provide a visual record of the conditions of the sampling area. Pictures of the sampling locations will be taken with 35-mm slide film. All rolls of film will be numbered with roll number and picture number recorded in the field log book.

4.3.2 Sample Handling Procedures

Soil samples will be removed from the sampling device at each sampling location with decontaminated stainless steel scupulas or trowels. All samples will be placed in laboratory prepared jars with teflon-lined screw caps immediately after collection. In no case will the samples come into contact with the field personnel or foreign objects not decontaminated as described in Section 4.4.

Samples to be analyzed for volatile organic compounds will be placed in the jars, and careful procedures will be used to insure that zero head space remains in the

Figure 4 - 2


BOREHOLE LOG
WORK ORDER # 3600-04-51
BORING/WELL #
CLIENT L.E. Carpenter
TOTAL DEPTH FT.
LOCATION Wharton, New Jersey
LOGGED BY
WESTON
DEPTH (FT.)
ELEV. (FT.)
SYM-BOL
SAMPLE
TYPE and NO.
BLOWS PER 6 in.
DEPTH RANGE (FT.)
REC. (FT.)
DESCRIPTION
0
5
10
15
20
25

jars. All samples will be stored on-site in coolers packed with ice and will be kept chilled to 4°C until they reach the testing laboratory.

All samples will be identified with a label which will be attached directly to the container. The sample location, sample number, depth, date, time and analysis to be conducted will be entered on the label with waterproof ink. Table 3-1 lists the sample numbers designated for the samples collected at this site.

4.3.3 Chain-of-Custody

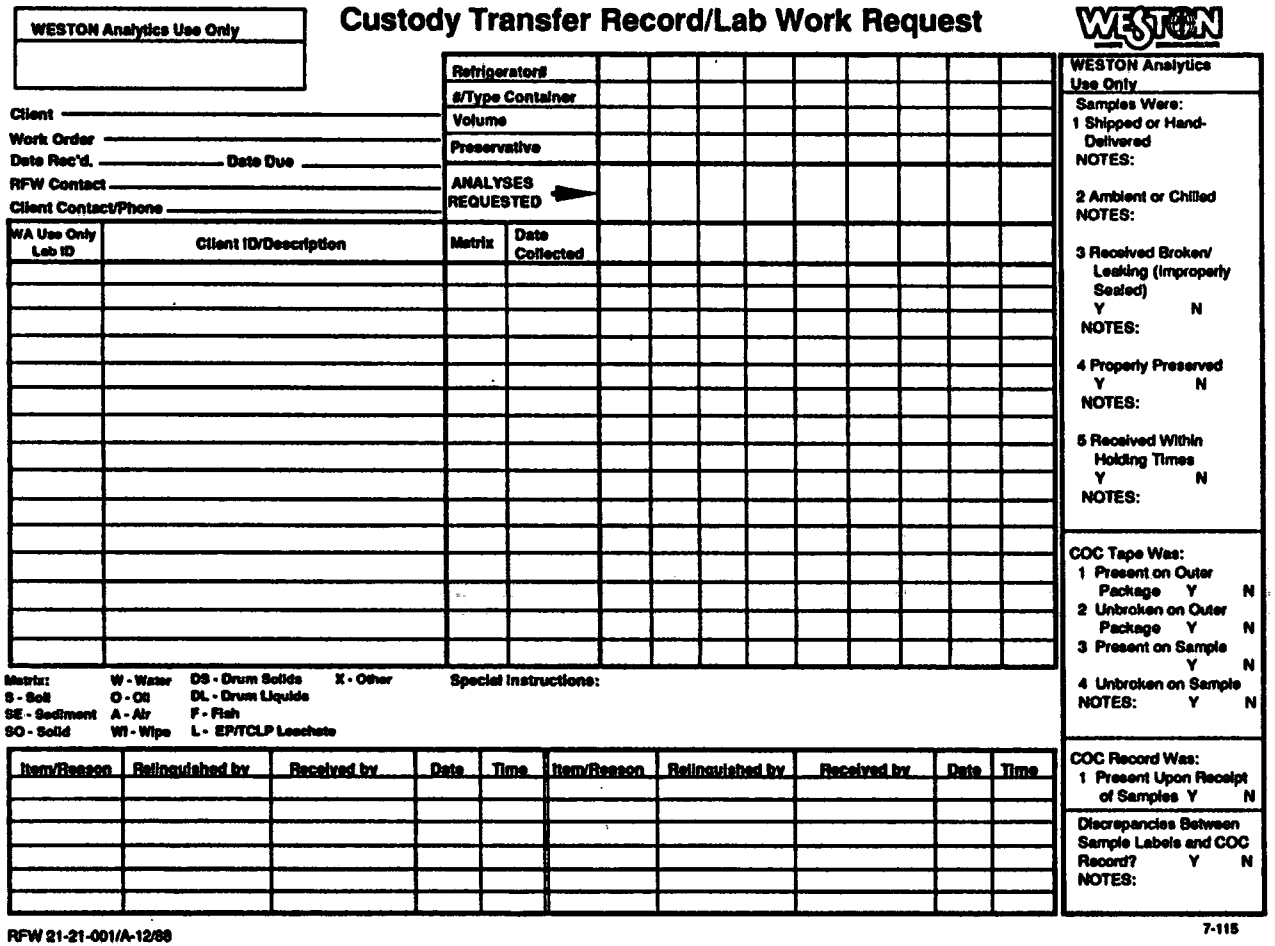
To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, a standard chain-of-custody form will be completed. This form will be completed in the field by designated field personnel and will accompany the samples to the laboratory. A sample chain-of-custody form is shown in Figure 4-3. Prior to shipment of samples, the chain-of-custody form will be signed and dated by a member of the field team who has verified that those samples indicated on the form are indeed being shipped. After packaging has been completed, custody seals, signed and dated by a member of the field team, will be placed on the cooler.

All samples will be shipped via overnight courier to the laboratory. Upon receipt of the samples at the laboratory, the receiver will complete the transfer by dating and signing the chain-of-custody form.

4.4 SAMPLING EQUIPMENT

The following list of equipment will be required to complete the sampling tasks:

HNu Photoionization Detector (with 10.2 eV probe)
Stainless Steel Trowels
Stainless Steel Scupulas
Steel Split Spoon Samplers
Teflon Bailer
Water Level Indicator
Conductivity/Temperature Meter
pH Meter
Decontamination Supplies
Personnel Safety Equipment (listed in Section 5)
Plastic Ground Cover
Sample Bottles and Labels
Coolers
Custody Seals and Chain-of-Custody Forms
Tape Measure
Log Book



WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request

WESTON

Client

Work Order

Date Rec'd. ____ Date Due

RFW Contact

Client Contact/Phone

WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected	Refrigerators	#/Type Container	Volume	Preservative	ANALYSES REQUESTED

Matrix: W - Water DS - Drum Solids X - Other
S - Soil O - Oil DL - Drum Liquids
SE - Sediment A - Air F - Fish
SO - Solid WI - Wipe L - EP/TCLP Leachate

Special Instructions:

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time

WESTON Analytics Use Only

Samples Were:
1 Shipped or Hand-Delivered
NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/Leaking (Improperly Sealed)
Y N
NOTES:

4 Properly Preserved
Y N
NOTES:

5 Received Within Holding Times
Y N
NOTES:

COC Tape Was:
1 Present on Outer Package Y N
2 Unbroken on Outer Package Y N
3 Present on Sample Y N
4 Unbroken on Sample Y N
NOTES:

COC Record Was:
1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y N
NOTES:

RFW 21-21-001/A-12/88

7-115

WESTON MANAGERS DESIGNERS/CONSULTANTS

FIGURE 4-3 LABORATORY CHAIN OF CUSTODY

4.5 SAMPLING EQUIPMENT DECONTAMINATION

Laboratory cleaned bailers and sample bottles will be provided by the laboratory performing the analysis prior to arrival at the site. This equipment will remain in the original packaging with custody seals in place until use. Information concerning the decontamination methodology, date, time and personnel will be recorded in the field log book.

All other sampling and ancillary drilling equipment which cannot be practically cleaned by the laboratory prior to use in the field will be decontaminated at the site prior to, and between each use. The following decontamination procedure will be used for sampling equipment such as stainless steel trowels, stainless steel scupulas and split spoon samplers.

- Non-phosphate detergent plus tap water wash
- Tap water rinse
- Distilled/deionized water rinse
- 10% nitric acid rinse (metals analysis only)
- Distilled/deionized water rinse
- Acetone (pesticide grade) rinse
- Total air dry
- Distilled/deionized water rinse

Prior to the start of drilling, all ancillary drilling equipment (augers, split spoon samplers) will be steam cleaned at a designated area. In addition, the drill rig or backhoe will be inspected for any fluid leaks. If a leak is detected, the equipment will be removed from service for repair or replacement. All drill rigs and ancillary equipment will be decontaminated prior to leaving the site to eliminate the transfer of contaminants off-site.

A decontamination area will be designated for both sampling equipment and drilling equipment. These areas will be located away from any potential sources of contamination and from any sampling activities.

All decontamination fluids, and drilling spoils will be handled in accordance with NJDEP Guidance Memorandum Disposition of Material Generated During Site Investigations, Appendix VII. Water suspected (visual observations, monitoring equipment indications) to be contaminated, they will be placed in lined, 55-gallon drums, and stored in a secure area. Once analysis is received, results will be reviewed with L.E. Carpenter personnel and a joint decision regarding the ultimate fate of purge water will be made between L.E. Carpenter and WSI. Likewise, drill and excavation spoils which appear to be contaminated, will be placed on plastic, covered, and sampled for disposal characteristics. Analysis will determine waste classification and assist in determining the fate of drill cuttings and excavated material.

4.6 FIELD MONITORING EQUIPMENT

4.6.1 HNu Photoionization Detector (with 10.2 eV probe)

An HNu photoionization analyzer will be used during field activities to measure concentration of trace gases. The HNu will be utilized for both health and safety purposes and the screening of samples collected. The analyzer employs the principle of photoionization for detection. A sensor, consisting of a sealed ultra-violet light source, emits photons which are energetic enough to ionize many trace species, particularly organic compounds. The instrument will be calibrated a minimum of once a day by following the listed procedures:

1. Turn instrument switch to the standby position and check the electronic zero. Reset zero potentiometer as necessary.

2. Insert on end of T tube into probe. Insert second end of probe into calibration gas in the 20-200 ppm range.

3. Set the function switch on the 0-200 ppm range.

4. Crack the valve on the pressured calibration gas container until a slight flow is indicated on the rotameter. The instrument will draw in the volume required for detection with the rotameter indicating excess flow.

5. Adjust the span potentiometer so that the instrument is reading the exact value of the calibration gas. (Calibration gas value is labeled on the cylinder.)

6. Next, set the function switch to the 0-20 ppm. Remove the mid-range (20-200 ppm) calibration gas cylinder and attach the low-range (0-20 ppm) calibration gas cylinder as described above.

7. The observed reading should be 3 ppm of the concentration specified for the low-range calibration gas. If this is not the case, recelebrate the mid-range scale repeating procedures 1 to 7 above. If the low-range reading consistently falls outside the recommended tolerance range, the probe light source window likely needs cleaning. When the observed reading is within the required tolerances, the instrument is fully calibrated.

8. Record on the form provided all original and readjusted settings as specified by the form.

4.7 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLES

QA/QC samples will be collected and analyzed as part of all field sampling activities. As per NJDEP "Field Sampling Procedures Manual (2/88), blanks and field blanks will be collected as part of each day of sampling activities. In addition, duplicate matrix spike and matrix spike duplicate samples will be collected. All QA/QC samples will be handled and collected as outlined in the NJDEP "Field Sampling Procedures Manual" (2/88). All laboratory analyses will use USEPA CLP methodology. All samples will be analyzed using the EPA-CLP statement of work. A summary of analytical methods is found in table 4-1. reporting limits are found in appendix b of the Quality Assurance project Plan. Description of the method calibration procedures are found in the QAPP.

4.7.1 Trip Blank

One trip blank (travel blank) will be prepared and analyzed for each day of sampling. The trip blank will be prepared in the laboratory with analyte-free water and shipped to the site with the sample bottles. The trip blanks will be handled, transported, and analyzed (for volatile organics only) in the same manner as the samples acquired that day, except that the containers themselves will not be opened in the field. The primary purpose of this type of blank sample is to detect additional sources of contamination that may potentially influence contaminant values reported in actual samples both quantitatively and qualitatively.

4.7.2 Field Blank

A field blank (field rinsate blank) will be prepared for each sampling event. The field blank will be collected by passing analyte-free water through clean sampling equipment (i.e., bailers, split spoon samplers) prior to sampling. This water will be placed in laboratory-supplied containers which were handled, transported, and analyzed in the same manner as the samples acquired that day. A field blank is used to indicate potential contamination for ambient air and from sampling instruments used to collect and transfer samples from the point of collection into sample containers.

4.7.3 Matrix Spike/Matrix Spike Duplicate

Matrix spike and matrix spike duplicate (MS/MSD) samples will be collected at a rate of five percent for each matrix sampled. The samples will be collected at the same time as the environmental sample and in an identical manner. The primary purpose of these samples is to provide an evaluation of any interference of analyte recovery which may be presented by the sampled matrix itself.

Table 4-1
Summary Method Table

Parameter	Method	Matrix
VO +10	CLP SOW - O	S + W
BN +10	CLP SOW - O	S + W
PCB	CLP SOW - O	S + W
PP metals	CLP SOW - I	S
TAL metals	CLP SOW - I	S + W

S - Soil, Sediment
W - Water

4.8 ANALYTICAL LABORATORY

All samples will be submitted to Weston Analytics for analysis. Weston Analytics is a New Jersey-certified laboratory. Weston's Lionville, Pennsylvania laboratory routinely performs EPA protocols to meet the requirements of the States of New York and New Jersey and numerous private clients.

Laboratory data reports will include sample analytical results, second column confirmation results, reportable field and laboratory QA/QC sample analytical results, and sample limits of detection (LODs) assembled in a NJDEP Tier I (CLP) format. The laboratory reporting format will be in accordance with guidelines outlined in the NJDEP, Division of Hazardous Waste Management Remedial Investigation Guide (March 1990).

The data quality of analytical data generated in the analytical laboratory is controlled by the implementation of Weston Analytics's Standard Analytical Laboratory Quality Assurance Plan.

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SECTION 5

HEALTH AND SAFETY PLAN

5.1 INTRODUCTION

The purpose of the Health and Safety Plan (HASP) is to define specific procedures and protocols that will be implemented to ensure the health and safety of all WSI personnel and WSI subcontractors during field activities for the L.E. Carpenter Remedial Investigation Sampling project. A copy of the HASP is presented in Appendix A and will be given to each WSI subcontractor, and a copy will be available at the work location. The information contained in this document is proprietary and cannot be released or duplicated without written permission. As stated previously, this HASP applies only to WSI, subcontractors of WSI and all subcontractors to WSI subcontractors. In addition, visitors to work locations on-site will be asked to adhere to these Health and Safety protocols. Any deviations from the Health and Safety Plan or program will be noted in WSI's Site Health and Safety Log. Consideration was given to the following references during development of this plan:

- Roy F. Weston Health and Standard Safe Operating Practices.
- OSHA Standards contained in 29CFR 1926 and 1910.
- U.S. EPA Environmental Response Team Standard Safe Operating Guidelines.
- OSHA/NIOSH/EPA/Coast Guard "Occupational Health and Safety Guidelines for Activities at Hazardous Waste Sites."
- NIOSH Pocket Guide to Chemical Hazards.
- (ACGIH) Threshold Limit Values for 1988-1989.
- Aerial photographs and historical background information from local (County) and State agencies.

This plan covers the full extent of sampling activities planned for the L.E. Carpenter RI Sampling project. Those activities include the following:

- Soil borings, and
- Surface water Sampling.

5.2 HEALTH AND SAFETY RESPONSIBILITIES

5.2.1 WSI and WSI Subcontractors

During each portion of scheduled field activities, WSI will assign one individual to serve as Site Health and Safety Coordinator (SHSC). That individual will be responsible for ensuring that all WSI personnel and WSI subcontractor activities are in conformance with the protocols defined in this document. The SHSC will have complete control over WSI Health and Safety matters onsite. He or she may at any time stop a WSI field activity if Health and Safety procedures are being compromised or are not sufficient. The SHSC will maintain direct contact with WSI's Corporate Health and Safety Director.

If more than one WSI field crew is required, one member from each crew will be assigned as the Field Safety Officer (FSO). The FSOs will have responsibility for Health and Safety compliance at each work location on-site and will maintain contact with the SHSC.

WSI's Corporate Health and Safety Director is ultimately responsible for ensuring that corporate Health and Safety policy is consistent with Federal and State regulations. In regard to site work at the L.E. Carpenter facility, the Corporate Health and Safety Director will review and approve this document. The project Health and Safety Coordinator, under the jurisdiction of the Director, will serve an audit function in order to ensure that the defined protocols are being implemented during field activities.

Other individuals responsible for the project's Health and Safety Plan include the Project Director, the Project Manager, and the Task Manager. The ultimate responsibility for project Health and Safety lies with the Project Director. In fulfillment of this responsibility, the Project Director, the Project Manager, and the Task Manager lend their support to site Health and Safety programs. Their support will be manifested by approving this HASP and by emphasizing the successful and SAFE completion of the project.

5.2.2 Visitors

Only visitors authorized by L.E. Carpenter will be permitted access to the WSI work area. They will be required to follow policies and procedures outlined in this HASP. Any visitor in the exclusion or contamination reduction zone will be expected to sign this HASP and conform to applicable OSHA standards. Visitors will be required to provide their own personnel protection equipment. If necessary, WSI can provide visitors with a work area-specific orientation/training. It is WSI's intent to be helpful to visitors, but it is important for visitors to recognize work areas and safe zones. In the event that a visitor does not adhere to the provisions of this HASP, the SHSC will record nonconformance in the Site Safety Log. If the SHSC deems that the nonconformance is threatening to the health and safety of personnel, he/she may decide to temporarily suspend site operations.

5.3 WSI'S HEALTH AND SAFETY PROGRAM

5.3.1 Medical Monitoring

In compliance with OSHA standards, all personnel will be enrolled in a Medical Monitoring program. All WSI personnel are required to monitor current medical status with an annual physical. Medical results and monitoring data for WSI personnel are reviewed by an independent oversight group from Jefferson Medical College in Philadelphia, Pennsylvania. All other contractor and subcontractor personnel will be required to have a Medical Monitoring program in place and must be certified by a physician to be medically fit to wear respiratory protection and to work with hazardous materials. The specific test parameters of the WSI medical exam are as follows:

- Medical history questionnaire.
- Physical examination by physician.
- Vitals: Height, Weight, Blood Pressure, Pulse.
- Audiometric test and questionnaire (0.5K, 1K, 2K, 3K, 4K, and 6K MZ levels).
- Pulmonary Function Test (FVC and FEV1).
- Resting electrocardiogram (12 lead).
- Laboratory analysis-Roche Panel 95992.
  - Blood chemistry profile.

- BC with differential.
- Routine urine analysis.
- Blood lead level and questionnaire.
- Zinc protoporphyrin determination.

- Heavy metal testing-Roche Panel 94870.
- Urinary arsenic, mercury, cadmium.
- PA chest x-ray (1 view).
- Other specific tests are performed on an individual basis.

All other contractor or subcontractor employers are responsible for defining the medical requirements for their personnel as appropriate.

5.3.2 Personnel Training

All WSI personnel are required to attend the Roy F. Weston, Inc. "Hazardous Incidents Response Operations Course." This is currently a 40-hour training course. Individuals who have attended WSI's 24-hour or 32-hour training courses meet the 40-hour requirement based on "grandfathering" of previous site experience. These courses certify WSI personnel to perform various activities in potentially hazardous locations in EPA-designated levels of protection B and C. In order to serve as an SHSC, an individual must have additional training (8 hours), 24 hours of on-site experience in the prescribed level of protection, and final approval by WSI's Corporate Health and Safety Director.

Prior to commencement of intrusive activities onsite, all personnel and subcontractors will attend a site-specific Health and Safety Orientation to be provided by the SHSC. The purpose of this training will be to familiarize project personnel with site-specific hazards, to ensure compliance with the Health and Safety Plan, and to fulfill "Right-to-Know" regulations. The contents of this training will include the following:

- Chemical hazards.
- Physical hazards.
- Levels of protection.
- Decontamination procedures
- Emergency procedures/telephone numbers.
- Hospital directions.
- Health and Safety Chain-of-Command.
- Respiratory check-out procedures.

Attendance at this training orientation will be documented on the HASP Approval and Compliance Sign-Off Form.

5.3.3 WSI Subcontractors

Subcontractors will be utilized to operate a mobile drilling rig for soil borings and monitoring well installation. The following information must be supplied by WSI subcontractors, and will be available onsite.

- A general statement indicating that the contractor's Health and Safety Program is in compliance with applicable sections of 29 CFR 1910 and 1926. Specifically, the statement must identify that the contractor's employees are aware of and that the contractor is in compliance with the OSHA's 1910.120 standard, "Hazardous Waste Operations and Emergency Response."

- A statement indicating that all employees who will or may take part in site operations are enrolled in and current with respect to a Medical Monitoring program that complies with OSHA standards.

- A statement indicating that the contractor will provide protective equipment for its own employees and that the equipment is NIOSH/OSHA approved.

- A statement indicating that the contractor and its employees will follow WSI's Health and Safety Plan and that they will cooperate with WSI's Site Health and Safety Coordinator.

- A matrix or listing of each employee that will be or may be involved with on-site activities. This list should include the following information for each employee:
  - Name
  - Start date
  - Medical date (certified fit to wear respiratory protection and to work on hazardous waste sites)
  - Training dates (specify type, quantity)
  - Experience in levels of protection (hours, weeks)
  - Years working in the field (drilling experience)

5.3.4 Exposure/Injury Reports

In the case of an injury or exposure to WSI personnel, an incident report will be filed with WSI's Corporate Health and Safety Director. A copy of that report will also be filed with the Project Manager. If an injury or exposure

occurs, the specific incident will be reported to the SHSC. The SHSC will immediately notify WSI's Corporate Health and Safety Director. The SHSC will ensure that Exposure/Injury Reports are completed. After review of the Exposure/Injury Report is complete, WSI's Corporate Health and Safety Department will investigate and recommend follow-up actions to be conducted to ensure that preventive measures are being implemented.

5.4 EMERGENCY RESPONSE/CONTINGENCY PLAN

This section describes the proposed Contingency and Emergency Response (ER) Plan for the L.E. Carpenter property. Minor modifications may be necessary dependent upon actual site set-up and conditions. The greatest need for an ER Plan is in the event of a medical emergency onsite. A minor potential to spill quantities of hazardous materials during sampling and transfer exists.

5.4.1 Pre-Emergency Planning

During the site briefings held periodically/daily, all employees will be trained in and reminded of provisions of this Emergency Response Plan, communication systems, and evacuation routes. The plan will be reviewed and revised if necessary, on a regular basis by the SHSC. This will ensure that the plan is adequate and consistent with prevailing site conditions.

5.4.2 Personnel Roles and Lines of Authority

The Site Supervisor has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site area, and evacuation of adjacent residents. He/she is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. The SHSC may be called upon to act on the behalf of the Site Supervisor, and will direct responses to any medical emergency.

5.4.3 Evacuation Routes and Procedures/Safe Distances

In the event of an emergency which necessitates an evacuation of the site, L.E. Carpenter alarm procedures will be implemented.

5.4.4 Site Security and Control

Following an Emergency Alarm signal, access to the site and immediate vicinity of the incident will be restricted. Depending upon the severity and location of the incident, physical barriers or banner guard will be used to delineate restricted areas. Site control will be the responsibility of the Site Supervisor who

will establish the new work area boundaries if necessary. Future entries into restricted areas will require permission from the Site Supervisor.

5.4.5 Emergency Decontamination Procedures

Normal decontamination procedures as defined in Appendix A will be modified to suit the specifics of the incident. For example, if the greatest risk of injury to personnel is physical and not chemical, careful removal of respirators may not be necessary under "hurry-up" conditions. The orderly sequence of clothing removal may be adapted to facilitate quick exit of personnel from hazardous conditions. In the event of a medical emergency, a decision will be made concerning the priority of decontaminating the patient relative to the potential for life threatening injuries. If a patient is contaminated, outer clothing can be cut-off and removed and/or the individual can be wrapped in plastic or a blanket.

5.4.6 Emergency Contact/Notification System and Alerting Procedures

Appendix A provides names and telephone numbers for emergency contact personnel. In the event of a medical emergency, personnel will take direction from the SHSC and notify the appropriate emergency organization. In the event of a fire or spill, the Site Supervisor will notify the appropriate local, State, and Federal agencies.

5.4.7 Emergency Medical Treatment Procedures

Appendix A provides the location of the hospital closest to the site. Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first-aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket). First-aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the Project Manager.

Any person being transported to a clinic or hospital for treatment should take with them information on the chemical(s) they have been exposed to at the site. This information is included in Appendix A.

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SECTION 6

SCHEDULE AND REPORTING

Individual activities have been selected to overlap or occur simultaneously as much as possible. The activities and proposed timetable described below will be initiated following final approval of this sampling plan by both NJDEP and L.E. Carpenter Corporation. The planned schedule for execution of field work related to this project will be as follows:

- Written notification to NJDEP seven (7) days prior to sampling activities. In addition, local authorities will be notified as to our activities.
- A drilling subcontractor will be procured to perform soil boring and split spoon sampling.
- Execution of sampling plan
- Survey of sampling points by a New Jersey licensed land surveyor
- Laboratory analysis (length of analysis dependent on turn-around-time selected by L.E. Carpenter)
- Draft Report
- Final Report

One draft report and a final report are planned to document the results of the field work. This report will detail the major phases of the effort including the Sampling Plan. The report will be prepared in accordance with the Division of Hazardous Waste Management Remedial Investigation Guide (1990).

HEALTH AND SAFETY PLAN

FOR THE

L.E. CARPENTER SITE

SITE HEALTH AND SAFETY PLAN (HASP) FORM

Prepared By Michael Heaney Date 5/14/90 W.O. # 3600-04-51

I. General Information

A. Project Identification

1. Division WSI/DATD/EDC 2. Department/Office Edison, New Jersey

4. Site Name L.E. Carpenter 5. Client M.A. Hanna Company

6. Work Location Address 170 North Main Street, Wharton, New Jersey 07885
(Street Address) (City) (State) (Zip)

B. Site History

1. Describe briefly Wallpaper manufacturing 1943-1987. Silk mill 1889-1943. Consent order entered 1982. Remedial investigation completed 1989 by Geo Engineering.

C. Scope of Work

1. Describe briefly Perform Follow-up RI, Risk Assessment, Feasibility Study and UST Inspection. Work to include stream and drainage ditch sampling and surveying. Potential for decommissioning.

( ) Site Visit only, Site HASP not necessary, list personnel here & sign-off below:

_____, _____, _____, _____

D. Hazard Assessment and Regulatory Status

1. Indicate Yes (Y)/No (N) to types of hazards anticipated. (Y) Physio-chemical; Toxic Chemical - Levels (N) >TLV-TWA, (N) >TLV-STEL, (N) >IDLH; (N) Bio-Hazards; (N) Radiation; (Y) Physical; (N) Construction type; (N) Industrial type; (N) Nuclear Industry type

2. Site Regulatory Status: CERCLA/SARA - (X) U.S. EPA, (X) State, (X) NPL Site; RCRA - ( ) U.S. EPA, ( ) State; OSHA - ( ) 1910, ( ) 1926, ( ) State; NRC - ( ) 10 CFR 20; Other Fed. Agency - ( ) DOE, ( ) USATHAMA, ( ) Air Force;

Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard Hasp will be used and append the appropriate pages of this Form along with the Standard Plan.

3. Standard Plan to be used: ( ) Stack Test ( ) Air Emissions ( ) Asbestos ( ) Industrial Hygiene ( ) Life Systems (X) Hazardous Mat. ( ) Construction ( ) NRC/DOE ( ) USATHAMA ( ) Air Force

D. Review and Approval Documentation

1. Reviewed By: a. P.M. Michael A. Heaney Date 5/31/90
b. P.D. [illegible] Date 6/5/90
c. DSO/RSO [illegible] Date 5-25-90
d. SHSC Scott Hubbard Date 5/31/90

2. Approved BY: Ted Blenkhorn Date 5-30-90
( ) a. Corporate Health and Safety Director (CHSD)
(X) b. DSO/RSO (Only with specific delegation by CHSD)

Project Start Date 6/1/90 ;End Date _____. This Site HASP must be Reissued/Reapproved for any activities conducted after: Date 12/31/90
Amendment Date(s) 1._____ 2._____ 3._____ 4._____ 5._____

1.0 Key Personnel (Continued)

WESTON Representatives

Organization	Name/Title	Address	Telephone
WESTON Project Manager	Michael Skirka	Raritan Plaza I, Edison, N.J. 08837	(201) 225-3990
WSI Project Manager	David Henderson	Raritan Plaza I, Edison, N.J.	(201) 225-3990
WESTON Lead Geologist	Alan Tamm	Raritan Plaza I, Edison, N.J.	(201) 225-3990
WESTON Project Engineer	Brian McGee	Weston Way, West Chester, PA. 19380	(215) 344-3777

Roles and Responsibilities: _____

(WESTON Subcontractors)

Organization/Branch	Name/Title	Address	Telephone
Geo Engineering, Inc.	William Dunnell/Project Manager	Dover, N.J.	(201)361-3600
Aquifer Systems, Inc.	Michael McTigue/Field Manager	Dover, N.J.	(201) 361-4406
Transformer Testers (to be named)	Susan DiIonna		
Surveyor	(to be named)		

Roles and Responsibilities: Geo Engineering, Inc. directed the original site RI with field sampling and operation of the floating product recovery system performed by Aquifer Systems, Inc. The quarterly GW sampling from MW-1 through MW-5 and the floating product recovery will continue to be performed by Aquifer Systems, Inc. as a WESTON subcontractor. This work is covered by this HASP (task 2).

2.2 Site Specific Health and Safety Personnel

The SHSC for activities to be conducted at this Site is Scott Hubbard

The Site Health and Safety Coordinator (SHSC) has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field. Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, the personnel assigned as SHSC's are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120

Qualifications: As per OSHA in 29 CFR 1910.120 including 40 hr basic training and 8 hr SHSC training.

Designated alternatives include: Alan Tamm and Michael Heaney.

II. Health and Safety Evaluation

A. Hazard Assessment

1. Background Review: Complete (X) Partial ( ) If partial, why? _____
Chemical contaminants of primary concern areDEHP, MEK and Xylene.

2. Activities Covered Under this Plan

No.	Task/Subtask	Description	Schedule
1	Surface Water	Grab samples of River and Drainage Ditch (Hand auger) Test pits.	June/July 1990
2	GW monitor/product recover	Sample monitor wells. Operate floating product recovery system	Quarterly
3	Surveying	Measure drainage ditch elevation	June/July 1990
4	Tank inspection	Inspect above and underground tanks. Ensure all are empty	June/July 1990
5	Transformer Inv.	Classify all transformers	June/July 1990
6	Feasibility Study	Collect samples for treatability test. Install interceptor trench.	Second half 1990

3. Types of Hazards: (Place a Y/N in each ( ) to indicate presence/absence of hazard)

a. PhysioChemical (Y) Flammable (N) Explosive (N) Corrosive (N) Reactive
(N) O_2 Rich (N) O_2 Deficient [1]*

Chemically Toxic (Y) Inhal. (Y) Ingest. (Y) Contact (Y) Absorb.
(Y) Carcin. (N) Mutagen (N) Terat.
( ) OSHA 1910.1000 Substance
( ) OSHA Specific Hazard. Sub. Standard, Describe _____

b. Biological (N) Etiol. Agent (N) Other - Plant,insect, animal, [2]*

c. Radiation Ionizing - (N) Internal Exposure (N) External exposure [3]*
Non-ionizing - (N) UV; (N) IR; (N) RF; (N) MicroW; (N) LASER

d. Physical Hazards (Y) [4]* e. Construction Activities (N) [5]*

* The number in the [ ] refers to one of the following hazard evaluation forms. Complete hazard evaluation forms for each appropriate Hazard Class.

B. Source/Location of Contaminants and Hazardous Substances

1. Directly Related to Tasks

(Y) Air _____; (Y) Soil _____;
(Y) Other Surface _____; (Y) S. Water (occasional xylene in drainage ditch)
(Y) G. Water _____; ( ) Other _____.

2. Indirectly Related to Work - Nearby Process(s) which could affect team members:

(N) Client Facility; (N) Nearby Non-client Facility. Describe _____
Nonclient wallpaper warehouse and welding shop pose no safety hazard.

( ) Client briefing arranged.
Client Contact is Cris Anderson, M.A. Hanna Co., 1301 East Ninth Street, Cleveland, OH 44114
(216) 589-4000 Fax: (216) 589-4329

[1] Chemical Hazards

[a] Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions or other materials identified as or which in normal use could produce hazardous substances used in performing tasks related to tasks related to this project. ( ) N/A (Acetone, Nitric Acid Solutions, Alconox)

[b] Chemical Contaminants of Concern ( ) N/A If present, provide following data.

Hazardous Substance/ Tasks	Physical Properties and Characteristics*	Exposure Limits PEL/TLV**	Route(s) of Exposure***/ Symptoms	Monitoring Instruments/IP+ % Response
Xylene (Tasks 1,2,4,6)	(* F) State liquid pH FP 81 F LEL 1.0% UEL 7% Auto.Ig N/A BP 281 MP -12 F Incompatible with - Strong oxidizers Sp.Gr 0.87 Vap.D >air Vap.P 9 H20 Sol. 0.00003% Oth. low odor threshold	100 ppm (TWA) 150 ppm (STEL)	I: Dizzy, drowsy 8.5 ev S: Irritated eyes, throat G: Anorexia, vomit C: Dermatitis	
Di-ethylhexyl pthalate (Tasks 1,2,4,6)	(*) State liquid pH FP 425 °F LEL N/A UEL N/A Auto.Ig N/A BP 727 °F MP -51 °F Incompatible with - Nitrates Strong Oxidizers Acid and Alkalides Sp.Gr 1.1 Vap.D N/A Vap.P <0.01mm H20 Sol. 0.005% Oth. Odorless , Carcinogen	5 mg/m^3(TWA) 10 mg/m^3(STEL)	I: Irritated eyes, mycous membranes C: Nausea, diarrhea G: Nausea, diarrhea	

* E = Explosive, F = Flammable, C = Corrosive, R = Reactive, W = Water reactive, O = Oxidi Ra = Radioactive. State = Normal physical state at site/proj. temp.

** Use lowest of two, if no TLV/PEL, use Toxicity data in following order: Lowest Toxic Co humans (LTC-HMN), Lowest Lethal Conc. in humans (LLC-HMN), Lowest Toxic Dose in humans (LT Lowest Lethal Dose in humans (LLD-HMN), LC_{50} or LD_{50} in humans, the Lowest Toxic Concentra Lowest Toxic Dose in animals, the lowest LC_{50} or LD_{50} in animals.

*** I = Inhalation, G = Ingestion, S = Skin Absorption, C= Contact, D - Direct Penetratio

+ IP = Ionization Potential

[1] Chemical Hazards

[a] Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions or other materials identified as or which in normal use could produce hazardous substances used in performing tasks related to tasks related to this project. ( ) N/A

[b] Chemical Contaminants of Concern ( ) N/A If present, provide following data.

Hazardous Substance/ Tasks	Physical Properties and Characteristics*	Exposure Limits PEL/TLV**	Route(s) of Exposure***/ Symptoms	Monitoring Instruments/IP+ % Response
Methyl Ethyl Ketone (MEK, 2-Butanone) (Tasks 1,2,4,6)	(* F) State liquid pH FP 21 F LEL 2% UEL 10% Auto.Ig 21°F BP 175°F MP -123°F Incompatible with - Very strong oxidizers Sp.Gr 0.81 Vap.D >Air Vap.P 70 mm H20 Sol. 27% Oth. Mint odor ,	200 ppm (TWA) 300 ppm (STEL) 3000ppm (IDLH)	I: Irritated eyes, nose G: Dizzy, vomiting	9.48ev
	(*) State pH FP LEL UEL Auto.Ig BP MP Incompatible with - Sp.Gr Vap.D Vap.P H20 Sol. Oth. ,			

* E = Explosive, F = Flammable, C = Corrosive, R = Reactive, W = Water reactive, O = Oxidi Ra = Radioactive.. State = Normal physical state at site/proj. temp.

** Use lowest of two, if no TLV/PEL, use Toxicity data in following order: Lowest Toxic Co humans (LTC-HMN), Lowest Lethal Conc. in humans (LLC-HMN), Lowest Toxic Dose in humans (LT Lowest Lethal Dose in humans (LLD-HMN), LC_{50} or LD_{50} in humans, the Lowest Toxic Concentra Lowest Toxic Dose in animals, the lowest LC_{50} or LD_{50} in animals.

*** I = Inhalation, G = Ingestion, S = Skin Absorption, C= Contact, D - Direct Penetratio

+ IP = Ionization Potential

[1] Chemical Hazards

[a] Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions or other materials identified as or which in normal use could produce hazardous substances used in performing tasks related to tasks related to this project. ( ) N/A

[b] Chemical Contaminants of Concern ( ) N/A If present, provide following data.

Hazardous Substance/ Tasks	Physical Properties and Characteristics*	Exposure Limits PEL/TLV**	Route(s) of Exposure***/ Symptoms	Monitoring Instruments/IP+ & Response
Arochlor 1254(PCB) (Tasks 1,5,6)	(*) State liquid pH FP 437°F LEL N/A UEL N/A Auto.Ig N/A BP 600°F MP 50°F Incompatible with - Strong oxidizers Sp.Gr 0.87 Vap.D N/A Vap.P 0.00006 mm H20 Sol. Insoluble Oth. Car ,	0.5 mg/m^3 (TLV)	I S: Burning eyes G: Liver damage C: Chloracne	The maximum concentration observed during the RI was 12,000 ppb in test pit 2B
Ethylbenzene (Tasks 1,2,4,6)	(* F) State liquid pH FP 59°F LEL 1.0% UEL 6.7% Auto.Ig N/A BP 277°F MP -139°F Incompatible with - Strong oxidizers Sp.Gr Vap.D >Air Vap.P 7.1 mm H20 Sol. 0.015% Oth. low odor threshold	100 ppm (TWA) 125 ppm (STEL) 2000 ppm (IDLH)	I: Narcosis G: Coma C:	8.76 ev

* E = Explosive, F = Flammable, C = Corrosive, R = Reactive, W = Water reactive, O = Oxidi Ra = Radioactive.. State = Normal physical state at site/proj. temp.

** Use lowest of two, if no TLV/PEL, use Toxicity data in following order: Lowest Toxic Co humans (LTC-HMN), Lowest Lethal Conc. in humans (LLC-HMN), Lowest Toxic Dose in humans (LT Lowest Lethal Dose in humans (LLD-HMN), LC_{50} or LD_{50} in humans, the Lowest Toxic Concentra Lowest Toxic Dose in animals, the lowest LC_{50} or LD_{50} in animals.

*** I = Inhalation, G = Ingestion, S = Skin Absorption, C= Contact, D - Direct Penetratio

+ IP = Ionization Potential

[1] Chemical Hazards

[a] Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions or other materials identified as or which in normal use could produce hazardous substances used in performing tasks related to tasks related to this project. ( ) N/A

[b] Chemical Contaminants of Concern ( ) N/A If present, provide following data.

Hazardous Substance/ Tasks	Physical Properties and Characteristics*	Exposure Limits PEL/TLV**	Route(s) of Exposure***/ Symptoms	Monitoring Instruments/IP+ & Response
Lead (Tasks 1,6)	(*) State solid pH FP N/A LEL N/A UEL N/A Auto.Ig N/A BP 2948F MP 622 °F Incompatible with - Strong oxidizers Sp.Gr 11.34 Vap.D N/A Vap.P N/A H20 Sol. insoluble Oth._____,_____	0.05 mg/m^3	I: Lassitude G: Constipation S: Tremors	
Mercury (Tasks 1,6)	(*) State liquid pH FP N/A LEL N/A UEL N/A Auto.Ig N/A BP 674 °F MP -38 °F Incompatible with - Acetylene Ammonia Sp.Gr 13.55 Vap.D N/A Vap.P 0.0012mm H20 Sol. 0.002% Oth._____,_____	0.05mg/m^3 (TWA) 0.1 mg/m^3 (ceiling) 28 mg/m^3 (IDLH)	I: Cough, bronchitis S: Tremors, insomnia C: Fatigue, irritated eyes and skin	

* E = Explosive, F = Flammable, C = Corrosive, R = Reactive, W = Water reactive, O = Oxidi Ra = Radioactive.. State = Normal physical state at site/proj. temp.

** Use lowest of two, if no TLV/PEL, use Toxicity data in following order: Lowest Toxic Co humans (LTC-HMN), Lowest Lethal Conc. in humans (LLC-HMN), Lowest Toxic Dose in humans (L Lowest Lethal Dose in humans (LLD-HMN), LC_{50} or LD_{50} in humans, the Lowest Toxic Concentra Lowest Toxic Dose in animals, the lowest LC_{50} or LD_{50} in animals.

*** I = Inhalation, G = Ingestion, S = Skin Absorption, C= Contact, D - Direct Penetratio

+ IP = Ionization Potential

[2] Biological Hazards Of Concern

No.	Hazard	(Y/N)	Task No.(s)*	Location/ Source (K,S)**	Route of Exposure (I,G,C,D)+	Team Member(s) Allergic?	Immunization Required?
1.	Poisonous Plants	(N)					
2.	Insects	(Y)	1,2,3,4,5,6	S	D (Mosquitoes, ticks, etc)		
3.	Snakes, Reptiles	(N)					
4.	Animals	(N)			(Lyme Desease)		
5.	Sewage	(N)					
6.	Etiologic Agents	(N) (List)					

* List all task Nos. which would involve potential exposure to these hazard(s).
** K = Known, S = Suspect. + I = Inhalation, G = Ingestion, C = Contact, D = Direct Penetration (Bite, Inject., Open wound or sore)

[3] Radiation Hazards of Concern

TYPE

1. Ionizing

	Location/ Source	TYPE EMITER	TASK NO.(S)	EXPOSURE LIMITS	Protection Protocol REFERENCE
RadioNuclide					

2. Non-ionizing

	Location/ Source	TASK NO.(S)	EXPOSURE LIMITS	Protection Protocol REFERENCE
Ultra violet				
Infra Red				
Microwave				
Radio-Freq.				
LASER				

[4] Physical Hazards of Concern

		Hazard (Y/N)	TASK No(s).	Protection OP(s) Attached
1.	Noise	(N)		
2.	Heat - ambient air	(Y)	1.2.3.4.5.6	X
	- Hot Process - Steam	(N)		
	- Hot Process - LT[3]	(N)		
	- Hot Process - Incin.	(N)		
3.	Cold	(N)		
4.	Rain	(Y)	1.2.3.4.5.6	X
5.	Snow	(N)		
6.	Electric Storms	(Y)	1.2.3.4.5.6	X
7.	Confined Space Entry	(N)		
8.	"Hot Work"	(N)		
9.	Heavy Manual Lifting/Moving	(Y)	1.2.6	X
10.	Rough Terrain	(N)		
11.	Housekeeping	(Y)	1.2.3.4.5.6	
12.	Structural Integrety	(Y)	4	
13.	Neighborhood	(N)		
14.	Remote Area	(N)		
15.	Compressed Gases	(N)		
16.	Diving	(N)		
17.	Using Boats	(N)		
18.	Working over Water	(N)		
19.	Traffic	(Y)	1.2.4	
20.	Explosives	(N)		
21.	Heavy Equipment Operation	(Y)	1.6	XIII
22.	Lifting Equipment Operation. - Cranes,	(N)		
	- Manlifts	(N)		
23.	Working at Elevation	(N)		
24.	Using Ladders	(N)		
25.	Using Scaffolding	(N)		
26.	Excavating/Trenching	(Y)	6	III
27.	Materials Handling	(N)		
28.	Haz. Mat. Use/Storage - flam.liq./gases	(Y)	2.4.6	V
	- oxidizers	(N)		
	- corrosives	(N)		
29.	Fire Prevent/Reponse plan required	(N)		
30.	Fire Extinguishers required	(Y)	2	IX
31.	Demolition	(N)		
32.	Utilities - Underground	(Y)	6	II
	- Overhead	(Y)	5	II
33.	Electrical - General	(Y)	2.5	IV
	- High Voltage	(Y)	5	IV
34.	Welding/cutting/burning	(N)		
35.	Hand tools	(Y)	1.2.3.4.5.6	XV
36.	Power Hand Tools	(Y)	1.2.6	XV
37.	High Pressure Water	(N)		
38.	Other _____	(N)		
39.	Other _____	(N)		
40.	Other _____	(N)		

TASK BY TASK RISK ANALYSIS

The preceding Tables identify the hazards known or suspected to be present in accomplishing the tasks involved in this project.

Section II A. 2. of this HASP describes the background of this site/project and identifies the tasks involved.

Below briefly describe each task and the likelihood of exposure to the hazards identified and the protective protocols to be used.

1. See attachments

1. Task 1 involves collection of surface water and sediment samples from the Rockaway River and Drainage Ditch and of soil samples from two areas where PCBs were detected. Additional background or other samples may be added to this sampling being performed as a follow up to the original RI. The objective PCB soil sampling is to delineate the PCB contamination which has been detected as high as 14 ppm. A phthalate compound of primary concern, DEHP, has been detected in the soil and sediment to be sampled as high as 520 ppm and on other parts of the site as high as 1%. In addition, xylene and ethylbenzene are present in soils to be sampled in the 14 ppm range and as high as 1200 ppm on other parts of the site.

   The soil sampling may involve power augers, hand augers or test pitting with a backhoe. No test pits over 5 feet in depth will be required. During the original RI, volatile concentrations (primarily xylene) in excess of the 50 ppm Level-C action level did occur primarily in the southeast corner of the site where no follow-up sampling is currently planned.

2. Task 2 involves operations in the on-going monitoring and maintenance of the site. These include:

   1. Quarterly sampling of MW-1 through MW-5
   2. Monthly water level and floating product thickness measurement
   3. Maintenance of the floating product skimmer pump system.

   These tasks are currently being performed by Aquifer Systems, Inc. (ASI) as a subcontractor to GEO Engineering and will continue to be performed by ASI according to this HASP as a subcontractor to WESTON.

   In addition to the chemical hazards associated with this site and the floating product xylene, this task also involves handling and storage of drums of xylene, a flammable liquid.

3. Task 3 surveying the elevation of the drainage ditch, involves working on rocky slopes of approximately 30% grade. The surveying contractor has not been selected at the time of this HASP.

4. Task 4, the tank inspection, will <u>not</u> involve any confined space entries or excavations, but will include "sticking" all tanks from the ground surface to evaluate the presence of stored product.

5. Task 5, the transformer classification, involves sampling the three block-mounted transformers west of building 12.

Subcontractors familiar with working with transformers will be utilized for this task.

6. Task 6 includes field activities to support the feasibility study. This work may include the collection of soil or groundwater samples for treatability testing, the installation of groundwater interceptor trenches, or the installation of groundwater depressing pumps into existing wells. No trenches of over 5-feet, the depth to water, will be required.

   Note: Of the chemical hazards described in this HASP, the specific compounds of most concern at this site from the standpoint of highest potential for worker exposure are:

   XYLENE
   DEHP
   MEK

   Other compounds described within the HASP, although present at the site, are considered to be lower potential exposures. Action levels for personal protective equipment choice have been based upon exposure to xylene, DEHP and MEK.

MAS\ks
FILE 3 WP50\SKIRKA\24MAY.TSK

III. Personnel Protection Plan

A. Engineering Controls

1. Describe Engineering Controls used as part of Personnel Protection Plan:

Task(s)

Engineering controls to control dust will be implemented if dusty conditions are created. Wetting down area.

B. Administrative Controls

1. Describe Administrative controls used as part of Personnel Protection Plan:

Task(s)

1,2,3,4,5,6 SHSC or designee will monitor activities on-site

C. Personnel Protective Equipment *

1. Action Levels for Changing Levels of Protection

(1) Task No.(s) Define Action Levels for up or down grade for each task

1 Upgrade to level C if HNu reading exceeds 50ppm. Elevated readings are possible during soil sampling and test pitting and during sampling wells with floating product.
- Use upgraded level D tyvex coverall during soil sampling.
- Use nitrile gloves whenever the potential for contact with soil or groundwater exists because:
(1) The soil contains PCB's and phthalates which are not readily detected by HNu.
(2) The groundwater contains high levels of xylenes which disloves latex gloves.
(3) Latex gloves contain phthalates which may contaminate the samples.
Opening of air-tight tank will be done in Level C.
Action levels are based on potential exposure to Xylene, DEHP and MEK.
Note: Level C upgrade will also occur if intrusive activities or weather will create dusty conditions at locations known to contain contaminants primarily associated with particulate hazards.

c. Description of Levels

Task(s)	1,3,4,5,6		1 (soil sampling),2	
	Level D		Level D	
Head	( )	( )	( ) tyvek-hood	( )
Eye & Face	( ) safety glass(es)	( )	( ) safety glasses	( )
Hearing	( )	( )	( )	( )
Arms & Legs only	( )	( )	( )	( )
Whole Body	( ) coveralls/	( )	( ) tyvek coveralls	( )
Apron	( ) work uniform	( )	( )	( )
Hand - gloves	( ) surgical latex	( )	( ) surgical latex	( )
- gloves	( ) outer nitrile	( )	( ) outer nitrile	( )
- gloves	( )	( )	( )	( )
Foot - Boots	( ) steel-toe	( )	( ) steel-toe	( )
- Boots	( )	( )	( ) boot covers	( )
- Boots	( )	( )	( )	( )

c. Description of Levels of Protection. (Cont.) Levels C and B

Task(s) 1,2,6 (above action level) _____

	Level C		Level _	
Head	( ) tyvek-hood	( )	( )	( )
Eye & Face	( ) safety glasses	( )	( )	( )
Hearing	( )	( )	( )	( )
Arms & Legs only	( )	( )	( )	( )
Whole Body	( ) tyvek-coveralls	( )	( )	( )
Apron	( )	( )	( )	( )
Hand - gloves	( ) latex surgicals	( )	( )	( )
- gloves	( ) outer nitrile	( )	( )	( )
- gloves	( )	( )	( )	( )
Foot - Boots	( ) steel-toe	( )	( )	( )
- Boots	( ) boot-covers	( )	( )	( )
- Boots	( )	( )	( )	( )
APR - Neg. Pres.	( )	( )	( )	( )
Half Face Cart./Canister	( ) general organic vapor/ HEPa filter	( )	( )	( )
Full Face	( ) full-face respirator	( )	( )	( )
Cart./Canister	( )	( )	( )	( )
PAPR	( )	( )	( )	( )
Cart./Canister	( )	( )	( )	( )
Type C SAR - Airline	( )	( )	( )	( )
SCBA	( )	( )	( )	( )
Comb.Airline/SCBA	( )	( )	( )	( )
Cascade Syst.	( )	( )	( )	( )
Compressor	( )	( )	( )	( )
Fall Protection	( )	( )	( )	( )
Floatation	( )	( )	( )	( )
_____	( )	( )	( )	( )

IV. Site or Project Hazard Monitoring Program

A. Direct Reading Air Monitoring Instruments

1. Instrument Selection & Initial Check Record

	No.	Task No.(s)	Instrument checked upon receipt	Initials
CGI-	( )	_____	( )_____	_____
O_2 -	( )	_____	( )_____	_____
CGI/O_2-	( )	_____	( )_____	_____
CGI/O_2/tox-PPM,H_2S,H_2S/CO	( )	_____	( )_____	_____
RAD-GM,	( )	_____	( )_____	_____
-NaI	( )	_____	( )_____	_____
-ZnS	( )	_____	( )_____	_____
-OTHER_____	(1)	_____	( )_____	_____
PID -HNU 10.2	(1)	1,2,3,4,5,6,	( )_____	_____
-HNU 11.7	( )	_____	( )_____	_____
-HNU 9.5,	( )	_____	( )_____	_____
-PHOTOVAC,TMA,OTHER	( )	_____	( )_____	_____
FID -FOX-128	( )	_____	( )_____	_____
-FOX 128GC	( )	_____	( )_____	_____
-HEATH,AID,OTHER_____	( )	_____	( )_____	_____
RAM, Mini-RAM, Other_____	( )	_____	( )_____	_____
MONITOX-HCN	( )	_____	( )_____	_____
H_2S	( )	_____	( )_____	_____
COCL,	( )	_____	( )_____	_____
SO_2,	( )	_____	( )_____	_____
OTHER_____	( )	_____	( )_____	_____
Bio-Aerosol Monitor	( )	_____	( )_____	_____
Detector Tubes				
Pump - MSA,Draeger,Sensidyne	( )	_____	( )_____	_____
- Tubes(No.)/type	( )	_____	( )_____	( )_____
- Tubes(No.)/type	( )	_____	( )_____	( )_____

Reporting Format ____1.Field notebook. ____2.Field data sheets. ____3.Air monitoring log.____4.Trip report.____5.Other:

2. Direct Reading Air Monitoring Instruments Calibration Record

Instrument, Mfg., Model, Eqp.ID. No.	Date	Time	Calib, Material	Calib. Method Mfg.'s	Other	Initial Setting& Reading	Final Setting& Reading	Calibs. Initials

Site Air Monitoring Program

Air Monitoring Instrument _____

Air Monitoring Frequency	Tasks
____ 1. Periodically _____	_____
____ 2. Periodically _____	_____
____ 3. Continuous	
____ 4. Other: _____	

Monitoring Locations	Tasks
____ 1. Upwind/downwind of site activities.	_____
____ 2. Near residents, etc.	_____
____ 3. Key site activity locations:	
____ decon area	_____
____ staging area	_____
____ excavation area	_____
____ field lab area	_____
____ storage tanks	_____
____ lagoons	_____
____ drums	_____
____ 4. Fixed stations	_____
____ 5. Other: _____	

Air Monitoring Instrument _____

Air Monitoring Frequency	Tasks
____ 1. Periodically _____	_____
____ 2. Periodically _____	_____
____ 3. Continuous	
____ 4. Other: _____	

Monitoring Locations	Tasks
____ 1. Upwind/downwind of site activities.	_____
____ 2. Near residents, etc.	_____
____ 3. Key site activity locations:	
____ decon area	_____
____ staging area	_____
____ excavation area	_____
____ field lab area	_____
____ storage tanks	_____
____ lagoons	_____
____ Drums	_____
____ 4. Fixed stations	_____
____ 5. Other: _____	

D. Action Levels

____ 1. Explosive atmosphere: Tasks _____

Action Level	Action
<10% LEL	Continue investigation
10%-25% LEL	Continue on-site monitoring with extreme caution as higher levels are encountered.
>25% LEL	Explosion hazard. **Withdraw from area immediately.**

____ 2. Oxygen: Tasks _____

Action Level	Action
<19.5%	Monitor wearing SCBA. NOTE: Combustible gas readings may not be valid in atmospheres with <19.5% oxygen.
19.5%-25%	Continue investigation with caution, as Oxygen levels > 21% require extreme caution. Other than normal level may be due to presence of other substances.
>25%	Fire hazard potential. Stop work and Consult a fire safety specialist.

____ 3. Radiation: Tasks _____

Action Level	Action
3 x Bkg - <2 mR/hr	Radiation above background levels (normally 0.01-0.02 mR/hr)9 signifies possible source(s) radiation present. Continue investigation with caution. Perform thorough monitoring. **Consult with a health physicist.**
> 2 mrem/hr	Potential radiation hazard. Evacuate site. Continue investigation only upon the advice of a health physicist.

✓ 4. Organic gases and vapors:

____ 5. Inorganic gases and vapors:

Action Level	Action
Depends on chemical	Consult standard reference manuals for air concentration/ toxicity data. Action level depends on PEL/REL/TLV.

These Action Levels, if not defined by regulation, is some percent (usually 50%) of the applicable PEL/REL/TLV. That number must also be adjusted to account for instrument response factors.

Ambient Air Sampling - Decision Logic and action levels to institute Air Sampling

_X_ No air sampling is required on this site. Just HNu at sample location. Extensive air sampling was conducted during the original RI from February to November 1989.

____ An air sampling plan is incorporated in this HASP. As summarized in section 5.5 of the RI, measured concentration did not exceed federal guidelines.

Check situations which will require or action levels which will apply to deciding to institute or increase scope of planned air sampling.

Meteorological conditions:

_N_ a. Dry weather for _____ days. ___ b. ambient temperature above ___ F°.

_N_ c. Wind increasing potential of more contaminant dispersion in or migration out of controlled area.

Activities which will require instituting or increasing scope of air sampling:

_Y_ a. major spills

_Y_ b. new site activity resulting in potential presence of new chemical hazards.

_Y_ c. site activity increases airborne contaminants possibilities.

_N_ d. Air sampling documentation required for:
___ Downgrading from stipulated level of protection.
___ Documenting no migration of contaminants off site through air

Applicable Action Levels for instituting Air Sampling: (Check as Appropriate)

_Y_ a. Visible vapor/gas clouds or vapors levels, or ____ b. Visible dust or particulate levels measured with Direct Reading Instrument, two - three times background or above action level, sustained over 10-15 minute period.

1) Sampling Matrix/
air interface - Monitor matrix/air interface and breathing zone periodically with DRI, if Vapor levels > 2-3 times background, monitor continuously, follow No. 4.

2) Container opening - Monitor opening and breathing zone periodically with DRI, if Vapor levels > 2-3 times background, monitor opening and breathing zone continuously, follow No. 4.

3) Excavation/Drilling/
Intrusive work - Monitor at ground level and breathing zone periodically with DRI, if Vapor levels > 2-3 times background, monitor opening and breathing zone continuously, follow No. 4.

4) Breathing zone - Ensure level of protection specified in HASP is being used. Consult HASP or Corporate Health and Safety relative to instituting personnel, area or perimeter Sampling.

Other: _____

B. Sample Location

____ 1. Ambient background - Locations: Substances Sampled for

a. _____ _____
b. _____ _____

____ 2. Personal samples, onsite - Locations

a. _____ _____
b. _____ _____
c. _____ _____
d. _____ _____
e. _____ _____
f. _____ _____

____ 3. Personal samples, offsite - Locations

a. _____ _____
b. _____ _____
c. _____ _____
d. _____ _____

____ 4. Fixed onsite samples - Locations:

a. _____ _____
b. _____ _____
c. _____ _____
d. _____ _____
e. _____ _____
f. _____ _____

____ 5. Fixed offsite samples - Locations:

a. _____ _____
b. _____ _____
c. _____ _____
d. _____ _____
e. _____ _____

____ 6. Mobile offsite samples - Locations:

a. _____ _____
b. _____ _____
c. _____ _____

____ 7. Mobile onsite samples - Locations:

a. _____ _____
b. _____ _____
c. _____ _____

____ 8. Background sample stations - Locations

a. _____ _____
b. _____ _____
c. _____ _____

B. Air Sampling

1. Personal Sampling Pumps - Gilian,SKC,MSA No. ( ) _____

Sampling Media - Sorbent Tubes

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

Sampling Media - Filter

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

Sampling Media - Impinger

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

Sampling Media - Air Bag

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

B. Air Sampling

2. Hi-Volume Pumps

Sampling Media - Filter

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

3. PORTABLE GAS CHROMATOGRAPH Task(S) _____ Type _____

Portable GC Analytical Plan: _____

4. Passive Dosimeters

		TASK(S)	TYPE	LOCATION	FREQUENCY	DURATION
Organic Vapor	( )					
Mercury Vapor	( )					
Paper Color Change	( )					
TLD	( )					
Film Badge	( )					
Liquid Media	( )					

5. WIPE SAMPLING

1. Wipe Sampling Plan _____

C. Physical Hazard and Miscellanous Monitors and Detectors

		TASK(S)	CALIBRATION RQD?	METHOD	Location	Frequency
SOUND LEVEL METER	( )	_____	( )	_____	_____	_____
NOISE DOSIMETER(s)	( )	_____	( )	_____	_____	_____
OCTAVE BAND ANALYER	( )	_____	( )	_____	_____	_____
LIGHT METER	( )	_____	( )	_____	_____	_____
ELECTRIC CIRC. DETECTOR	( )	_____	( )	_____	_____	_____
Thermometer	( )	_____	( )	_____	_____	_____
Wind Speed Indic.	( )	_____	( )	_____	_____	_____
Barometer	( )	_____	( )	_____	_____	_____
Psychrometer	( )	_____	( )	_____	_____	_____
Infra Red Thermom.	( )	_____	( )	_____	_____	_____
Micro Wave Detector	( )	_____	( )	_____	_____	_____
pH METER	( )	_____	( )	_____	_____	_____

D. Indicator Kits

		TASK(S)	LOCATION	FREQUENCY
pH PAPER	( )	_____	_____	_____
PEROXIDE PAPER	( )	_____	_____	_____
CHLOR-N-OIL KIT	( )	_____	_____	_____
HAZARD CATAGORIZING KIT	( )	_____	_____	_____
ASBESTOS TEST KIT	( )	_____	_____	_____

G. Work Location Instrument Readings

Location_____

% LEL ____,____,____,____; % O_2 ____,____,____,____; PID ppm ____,____,____

FID ppm ____ ____ ____ Aerosol Monitor mg/M^3 ____,____,____

GM: Shield Probe/Thin Window - mR/hr____,____,____;cpm____,____,____

NaI____,____,____,____uR/hr; ZnS____,____,____,____cpm

(Monitox)ppm: ( )____,____,____,____; ( )____,____,____,____,____;

( )____,____,____,____,____; ( )____,____,____,____,____;

(Detector Tube)(s): ( )____,____,____,____; ( )____,____,____,____;

( )____,____,____,____; ( )____,____,____,____; ( )____,____,____

Sound Levels ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; __

Illumination _____ pH _____ Other_____ ____ Other_____ ____ Other _____

Location_____

% LEL ____,____,____,____; % O_2 ____,____,____,____; PID ppm ____,____,____

FID ppm ____ ____ ____ Aerosol Monitor mg/M^3 ____,____,____

GM: Shield Probe/Thin Window - mR/hr____,____,____;cpm____,____,____

NaI____,____,____,____uR/hr; ZnS____,____,____,____cpm

(Monitox)ppm: ( )____,____,____,____; ( )____,____,____,____,____;

( )____,____,____,____,____; ( )____,____,____,____,____;

(Detector Tube)(s): ( )____,____,____,____; ( )____,____,____,____;

( )____,____,____,____; ( )____,____,____,____; ( )____,____,____

Sound Levels ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; __

Illumination _____ pH _____ Other_____ ____ Other_____ ____ Other ____ __

IV. DECONTAMINATION PLAN

1. Personnel Decontamination

Section III C. lists the tasks and specific levels of protection required for each. Consistent with the levels of protection required, step by step procedures for personnel decontamination for each Level of Protection are attached.

2. Levels of Protection Required for Decontamination Personnel

The levels of protection required for personnel assisting with decontamination will be [___ Level B, ___ Level C, ___ Level D].
(CHECK) Modifications include: _____

4. Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery folllows: _____

5. Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure:
(1) alconox solution (2) water rinse (3) 10% nitric acid rinse (if sample analysis is to include metals) (4) DI water rinse (5) acetone rinse (pesticide grade) (6) air dry

3. Disposition of Decontamination Wastes

(Provide a description of waste disposition including identification of storage area, hauler, and final disposal site if applicable.)
Purge water, drill cuttings, and contaminated trash is to be drummed for disposal. Other trash can be disposed of in on-site dumpster.
Disposal plans are not finalized at the time of this HASP.

V. Contingencies

A. Emergency Contacts and Phone Numbers

Agency	Contact	Phone Number
Local Medical Emergency Facility	Dover General Hospital	(201) 989-3200
WESTON Medical Emergency Contact	AGATHA	(513) 421-3063
WESTON Health and Safety	George Crawford	(215) 430-7406
Fire Department	Wharton Borough	(201) 366-1489
Police Department	Wharton Borough	(201) 366-0557
On Site Coordinator (Client)	Dave Condon (Dover)	(201) 366-1050
Site Telephone		
Nearest Telephone (Viortex)	(site)	(201) 366-2020
	(Location) 24hr	(215) 692-3030

B. LOCAL MEDICAL EMERGENCY FACILITY(S)

1. Primary

Name of Hospital Dover General Hospital

Address: Jardine Street, Dover, New Jersey Phone No. (201) 989-3200

Name of Contact Mary Smith (Head ER Nurse) Phone No. _____

Type of Service - Physical Trauma only ( ) Chemical Exposure only( )
Physical Trauma & Chemical Exposure ( ) Available 24 Hours ( )

Route to Hospital: (Attach Map) Take Main Street 2 miles. Make a left (at light) onto 46th Street. Make a quick right onto St. Mary's Street and a left onto Jardine Street.

Travel Time From Site (Minutes) 15 Distance to Hospital (Miles) 2.3 Name/No. of 24 Hr. Ambulance Service Quality Ambulance (201) 361-8469

2. Secondary or Specialty Services Provider

Name of Hospital _____

Address: _____ Phone No. _____

Name of Contact _____ Phone No. _____

Type of Service - Physical Trauma only ( ) Chemical Exposure only( )
Physical Trauma & Chemical Exposure ( ) Available 24 Hours ( )

Route to Hospital: (Attach Map) _____

Travel Time From Site (Minutes) _____ Distance to Hospital (Miles) _____ Name/No. of 24 Hr. Ambulance Service _____

V. Contingencies (Continued)

C. Response Plans

1. Medical - General

Drive route to hospital for familiarization.

a. First Aid Kit - Type / Location

standard / field vehicle

b. Eyewash required (Y)Y/N

Location: Field vehicle; Location: within 25 feet of corrosive operations

c. Safety Shower

Location

2. Special First Aid Procedures

Hydrofluide on site (N)Y/N

a. Attach HF procedure and ensure solution is on site.

Cyanides on site (N)Y/N

b. Confirm that Local Med. Emerg. Facility has antidote kit.

c.

3. Plan for Response to Fire/Explosion

Potential sources of fire include: drums of recovered floating product (xylene), and gas for generators, power augers, trenchers, or backhoes.
Leave the site.

4. Fire extinguisher

a. Type: ABC

b. Location: field vehicle

5. Plan for Response to Spill/Release

Most areas are unpaved.
Forseeable spills include small quantities of hexane (decon solvent) or xylene.
Containment of a small spill in an unpaved area would be infeasible.
Leave areas until fumes dissipate.

6. Spill Response Gear

Description / Location

6. Plan for Response to Security Problems

VI. Site Personnel and Certification Status

A. WESTON

Name	Title	Task(s)	Medical Current a.	Fit Test Current Qual. b.	Fit Test Current Quant. b.	Training Current c.	Certification Level or Description
1. Alan Tamm	Geologist	1,2,4,5,6	X	X		X	B-T
1.Michael Heany	Asst, Engineer	1,6,	X	X		X	B-T
2.David Henderson	Project Manager	4,5,6	X	X		X	B-T
3.Michael Skirka	Project Manager	6	X	X		X	B-T
4.Brian Magee	Project Engineer	6	X	X		X	B-T/C-S
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
Site Health and Safety Coordinator (SHSC)							
14. Scott Hubbard	Senior Field Tech.	1,2,4,5,6	X	X		X	C-S/B-T

(a) Training - All personnel, including visitors, entering the exclusion or contamination reduction zones must have certifications of completion of training in accordance with OSHA 29 CFR 1910 29, CFR 1926/1910 or 29 CFR 1910.120.

(b) Respirator Fit Testing - All persons, including visitors, entering any area requiring the use or potential use of any negative pressure respirator must have had as a minimum, a qualitative fit test, administered in accordance with OSHA 29 CFR 1910.134 or ANSI within the last 12 months. If site conditions require the use of a full face negative pressure, air purifying respirator for protection from Asbestos or lead, employees must have had a Quantitative fit test, administered according to OSHA 29 CFR 1910.1002 or 1025 within the last 6 months.

(c) Medical Monitoring Requirements - All personnel, including visitors, entering the exclusion or contamination reduction zones must be certified as medically fit to work, and to wear a respirator, if appropriate, in accordance with 29 CFR 1910, 29 CFR 1926/1910 or 29 CFR 1910.120.

The Site Health and Safety Coordinator is responsible for verifying all certifications and fit tests.

B. Subcontractor's Health and Safety Program Evaluation

Name and address of subcontractor: Aquifer Systems, Inc., Mineral Spring Drive, Dover, New Jersey 07801 Surveyor to be named.

Activities to be conducted by subcontractor: Task 2 by Aquifer Systems
Task 3 by Surveyors

Aquifer Systems, Inc. EVALUATION CRITERIA

Item	Acceptable	Unacceptable	Comments
Medical Program meets OSHA/WESTON Criteria	(X)	( )	
Personal Protective Equipment Available:			
a. meets OSHA criteria,	(X)	( )	
b. is as specified in WLHASP	( )	( )	
On-Site Monitoring Equipment Available, Calibrated and Operated Properly	(X)	( )	HNu
Safe Working Procedures Clearly Specified	(X)	( )	
Training meets OSHA/WESTON Criteria	(X)	( )	
Emergency Procedures	(X)	( )	
Decontamination Procedures	(X)	( )	
General Health and Safety Program Evaluation	(X)	( )	

Additional Comments: Weston evaluation based on verbal assurance by subcontractor and approval of previous HASP for this site prepared by subcontractor. See telecon dated 5/15.

Evaluation conducted by: Michael Heany Date: 5/15/90

C. Subcontractor

Name	Title	Task(s)	Medical Current a.	Fit Test Current Qual. b.	Fit Test Current Quant. b.	Training Current c.	Certification Level or Description
1.Bruce Adelberg	Feild Tech.	2	(X)	(X)	( )	(X)	(B-T)
2.Susan Di Ionno	Field Tech.	2	(X)	(X)	( )	(X)	(B-T)
3.Thomas Balogh	Field Tech.	2	(X)	(X)	( )	(X)	(B-T)
4.Michael McTigue	General Mgr.	2	(X)	(X)	( )	(X)	(B-T)
5.Scott Olson	Field Tech.	2	(X)	(X)	( )	(X)	(B-T)
6.Noreen Rocco	Field Tech.	2	(X)	(X)	( )	(X)	(B-T)
7.Thomas Shanahan	Field Tech.	2	(X)	(X)	( )	(X)	(B-T)

VII. HEALTH AND SAFETY PLAN APPROVAL/SIGN OFF FORMAT

1. Site Name L.E. Carpenter 2. WO# 3600-04-51

Work Location Address 170 North Main Street, Wharton, New Jersey 07885
(Street Address) (City) (State) (Zip)

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

Site Safety Co-ordinator	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

VIII. Training and Briefing Topics

The following items will be covered at the site specific training meeting, daily or periodically.

Site Specific Training Meeting	Daily	Periodically	
✓		✓	Site characterization and analysis, Sec. 3.0; 29 CFR 1910.120 i.
✓		✓	Physical hazards, Table 3.2.
✓		✓	Chemical hazards, Table 3.1.
✓		✓	Animal bites, stings and poisonous plants.
			Etiologic (Infectious) Agents.
✓		✓	Site control, Sec. 8.0; 29 CFR 1910.120 d.
✓		✓	Engineering controls and work practices, Sec. 8.5; 29 CFR 1910.120 g.
✓		✓	Heavy Machinery.
			Forklift
✓		✓	Backhoe
			Equipment
			Tools
			Ladder 29 CFR 1910.27 d.
✓		✓	Overhead and Underground Utilities
			Scaffolds
✓		✓	Structural Integrity
			Unguarded Openings-wall, Floor, Ceilings (?).
			Pressurized Air Cyclinders
✓		✓	Personnel Protective Equipment, Sec. 5.0; 29 CFR 1910.120 g; 29 CFR 1910.134

Site Specific Training Meeting	Daily	Periodically	
✓		✓	Respiratory Protection Sec. 5.8; 29 CFR 1910.120g; Z88.2-1980.
			Level A
			Level B
✓		✓	Level C
✓		✓	Level D
✓		✓	Monitoring, Sec. 7.0; 29 CFR 1910.120 h.
✓		✓	Decontamination, Sec. 9.0; 29 CFR 1910.120 k.
			Emergency Response, Sec. 10.0; 29 CFR 1910.120 l.
			Elements of an Emergency Response, Sec. 100; 29 CFR 1910.120 l.
✓		✓	Procedures for Handling Site Emergency Incidents, Sec. 10.0; 29 CFR 1910.120 l.
			Off Site Emergency Response, 29 CFR 1910.120 l.
✓		✓	Handling Drums and Containers, 29 CFR 1910.120 j.
✓		✓	Opening Drums and Containers
✓		✓	Electrical Material Handling Equipment.
			Radioactive Waste.
			Shock Sensitive Waste.
			Laboratory Waste Packs.
			Sampling Drums and Containers.
			Shipping and Transport, 49 CFR 172.101
			Tank and Vault Procedures.
✓		✓	Illumination, 29 CFR 1910.120 m.
✓		✓	Sanitation, 29 CFR 1910.120 n.

Attachment 1. Level D/Modified Level D Decontamination
[Check indicated Functions or add steps as necessary]

STEP	FUNCTION	DESCRIPTION OF PROCESS, SOLUTION AND CONTAINER
( )	Segregated equipment drop	
( )	Boot cover and glove wash	
( )	Boot cover and glove rinse	
(X)	Tape removal - outer glove and boot	
(X)	Boot cover removal	
(X)	Outer glove removal	
	HOT-LINE	
( )	Suit/safety boot wash	
( )	Suit/boot/glove rinse	
( )	Safety boot removal	
(X)	Suit Removal	
( )	Inner glove wash	
( )	Inner glove rinse	
(X)	Inner glove removal	
( )	Inner clothing removal	
	CRC/SAFE ZONE BOUNDARY	
( )	Field wash	
( )	Redress	

DISPOSAL PLAN:
END OF DAY: Drum purge water and contaminated trash.
END OF WEEK:
END OF PROJECT:

Attachment 2. LEVEL C DECONTAMINATION
[Check indicated Functions or add steps as necessary]

STEP	FUNCTION	DESCRIPTION OF PROCESS, SOLUTION AND CONTAINER
( )	Segregated equipment drop	
( )	Boot cover and glove wash	
( )	Boot cover and glove rinse	
( )	Tape removal - outer glove/boot	
(X)	Boot cover removal	
(X)	Outer glove removal	
	HOT-LINE	
( )	Suit/safety boot wash	
( )	Suit/boot/glove rinse	
(X)	Safety boot removal	
(X)	Suit Removal	
( )	Inner glove wash	
( )	Inner glove rinse	
(X)	Face piece removal	
(X)	Inner glove removal	
( )	Inner clothing removal	
	CRC/SAFE ZONE BOUNDARY	
( )	Field wash	
( )	Redress	

DISPOSAL PLAN:
END OF DAY: Drum purge water and contaminated trash for disposal.

END OF WEEK:

END OF PROJECT:

Attachment 3. LEVEL B DECONTAMINATION
[Check indicated Functions or add steps as necessary]

STEP	FUNCTION	DESCRIPTION OF PROCESS, SOLUTION AND CONTAINER
( )	Segregated equipment drop	_____
( )	Boot cover and glove wash	
( )	Boot cover and glove rinse	_____
( )	Tape removal - outer glove/boot	_____
( )	Boot cover removal	_____
( )	Outer glove removal	_____
	----------HOT-LINE----------	
( )	Suit/safety boot wash	_____
( )	Suit/SCBA/boot/glove rinse	_____
( )	Safety boot removal	_____
( )	Remove SCBA backpack w/o disconnecting	_____
( )	Splash suit removal	_____
( )	Inner glove wash	_____
( )	Inner glove rinse	_____
( )	SCBA Disconnect & Face piece removal	_____
( )	Inner glove removal	_____
( )	Inner clothing removal	_____
	----------CRC/SAFE ZONE BOUNDARY----------	
( )	Field wash	_____
( )	Redress	_____

DISPOSAL PLAN:
END OF DAY: _____

END OF WEEK: _____

END OF PROJECT: _____

E. KEY PERSONNEL/IDENTIFICATION OF HEALTH AND SAFETY PERSONNEL

1.0 Key Personnel

The following personnel and organizations are key to the activities at this site.

EPA Representatives / NJDEP (State-lead)

Organization/Branch	Name/Title	Address	Telephone
NJDEP	Edgar Kaup/Case Mgr.	CN028 Trenton, N.J. 08625	(609) 633-1455

Roles and Responsibilities: _____

Other EPA Contractors & Subcontractors

Organization/Branch	Name/Title	Address	Telephone
Aquifer Systems, Inc.	Mike TcTigue	Mineral Springs Dr., Dover, N.J.	(201) 361-4400
GEO Engineering	Bill Dunnell	150 Mineral Springs Dr. Dover, N.J.	(201) 361-3600

Roles and Responsibilities: Aquifer Systems, Inc. to perform Task 2. GEO was previous contractor.

Other Regulatory Agency Representatives

Organization/Branch	Name/Title	Address	Telephone

Roles and Responsibilities: _____

[1] Chemical Hazards

[a] Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions or other materials identified as or which in normal use could produce hazardous substances used in performing tasks related to tasks related to this project. ( ) N/A

[b] Chemical Contaminants of Concern ( ) N/A If present, provide following data.

Hazardous Substance/ Tasks	Physical Properties and Characteristics*	Exposure Limits PEL/TLV**	Route(s)of Exposure***/ Symptoms	Monitoring Instruments/IP+ % Response
	(*) State_____ pH___FP_____LEL_____UEL_____ Auto.Ig_____BP _____MP_____ Incompatible with - _____ _____ _____ Sp.Gr_____Vap.D_____ Vap.P_____H20 Sol._____ Oth._____,_____			
	(*) State_____ pH___FP_____LEL_____UEL_____ Auto.Ig_____BP _____MP_____ Incompatible with - _____ _____ _____ Sp.Gr_____Vap.D_____ Vap.P_____H20 Sol._____ Oth._____,_____			

* E = Explosive, F = Flammable, C = Corrosive, R = Reactive, W = Water reactive, O = Oxidi
Ra = Radioactive.. State = Normal physical state at site/proj. temp.

** Use lowest of two, if no TLV/PEL, use Toxicity data in following order: Lowest Toxic Co humans (LTC-HMN), Lowest Lethal Conc. in humans (LLC-HMN), Lowest Toxic Dose in humans (LTD-HMN), Lowest Lethal Dose in humans (LLD-HMN), LC_{50} or LD_{50} in humans, the Lowest Toxic Concentra Lowest Toxic Dose in animals, the lowest LC_{50} or LD_{50} in animals.

*** I = Inhalation, G = Ingestion, S = Skin Absorption, C= Contact, D - Direct Penetratic

+ IP = Ionization Potential

c. Description of Levels of Protection. (Cont.) Levels C and B

Task(s)	_____		_____	
	Level _		Level _	
Head	( )_____	( )_____	( )_____	( )_____
Eye & Face	( )_____	( )_____	( )_____	( )_____
Hearing	( )_____	( )_____	( )_____	( )_____
Arms & Legs only	( )_____	( )_____	( )_____	( )_____
Whole Body	( )_____	( )_____	( )_____	( )_____
Apron	( )_____	( )_____	( )_____	( )_____
Hand - gloves	( )_____	( )_____	( )_____	( )_____
- gloves	( )_____	( )_____	( )_____	( )_____
- gloves	( )_____	( )_____	( )_____	( )_____
Foot - Boots	( )_____	( )_____	( )_____	( )_____
- Boots	( )_____	( )_____	( )_____	( )_____
- Boots	( )_____	( )_____	( )_____	( )_____
APR - Neg. Pres. Half Face	( )_____	( )_____	( )_____	( )_____
Cart./Canister	( )_____	( )_____	( )_____	( )_____
Full Face	( )_____	( )_____	( )_____	( )_____
Cart./Canister	( )_____	( )_____	( )_____	( )_____
PAPR	( )_____	( )_____	( )_____	( )_____
Cart./Canister	( )_____	( )_____	( )_____	( )_____
Type C SAR - Airline	( )_____	( )_____	( )_____	( )_____
SCBA	( )_____	( )_____	( )_____	( )_____
Comb.Airline/SCBA	( )_____	( )_____	( )_____	( )_____
Cascade Syst.	( )_____	( )_____	( )_____	( )_____
Compressor	( )_____	( )_____	( )_____	( )_____
Fall Protection	( )_____	( )_____	( )_____	( )_____
Floatation	( )_____	( )_____	( )_____	( )_____
_____	( )_____	( )_____	( )_____	( )_____

2. Direct Reading Air Monitoring Instruments Calibration Record

Instrument, Mfg., Model, Eqp.ID. No.	Date	Time	Calib, Material	Calib. Method Mfg.'s	Other	Initial Setting& Reading	Final Setting& Reading	Calibs. Initials

Site Air Monitoring Program

Air Monitoring Instrument _____

Air Monitoring Frequency	Tasks
____ 1. Periodically _____	_____
____ 2. Periodically _____	_____
____ 3. Continuous	
____ 4. Other: _____	

Monitoring Locations	Tasks
____ 1. Upwind/downwind of site activities.	_____
____ 2. Near residents, etc.	_____
____ 3. Key site activity locations:	
____ decon area	_____
____ staging area	_____
____ excavation area	_____
____ field lab area	_____
____ storage tanks	_____
____ lagoons	_____
____ drums	_____
____ 4. Fixed stations	_____
____ 5. Other: _____	

Air Monitoring Instrument _____

Air Monitoring Frequency	Tasks
____ 1. Periodically _____	_____
____ 2. Periodically _____	_____
____ 3. Continuous	
____ 4. Other: _____	

Monitoring Locations	Tasks
____ 1. Upwind/downwind of site activities.	_____
____ 2. Near residents, etc.	_____
____ 3. Key site activity locations:	
____ decon area	_____
____ staging area	_____
____ excavation area	_____
____ field lab area	_____
____ storage tanks	_____
____ lagoons	_____
____ Drums	_____
____ 4. Fixed stations	_____
____ 5. Other: _____	

B. Sample Location

____ 1. Ambient background - Locations: Substances Sampled for

a. _____ _____
b. _____ _____

____ 2. Personal samples, onsite - Locations

a. _____ _____
b. _____ _____
c. _____ _____
d. _____ _____
e. _____ _____
f. _____ _____

____ 3. Personal samples, offsite - Locations

a. _____ _____
b. _____ _____
c. _____ _____
d. _____ _____

____ 4. Fixed onsite samples - Locations:

a. _____ _____
b. _____ _____
c. _____ _____
d. _____ _____
e. _____ _____
f. _____ _____

____ 5. Fixed offsite samples - Locations:

a. _____ _____
b. _____ _____
c. _____ _____
d. _____ _____
e. _____ _____

____ 6. Mobile offsite samples - Locations:

a. _____ _____
b. _____ _____
c. _____ _____

____ 7. Mobile onsite samples - Locations:

a. _____ _____
b. _____ _____
c. _____ _____

____ 8. Background sample stations - Locations

a. _____ _____
b. _____ _____
c. _____ _____

B. Air Sampling

1. Personal Sampling Pumps - Gilian,SKC,MSA No. ( ) _____

Sampling Media - Sorbent Tubes

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

Sampling Media - Filter

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

Sampling Media - Impinger

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

Sampling Media - Air Bag

Task(s)	Location	Duration	Frequency	Type	Anal. Meth

G. Work Location Instrument Readings

Location_____

% LEL ____,____,____,____; % O_2 ____,____,____,____; PID ppm ____,____,____

FID ppm ____ ____ ____ Aerosol Monitor mg/M^3 ____,____,____

GM: Shield Probe/Thin Window - mR/hr____,____,____;cpm____,____,____

NaI____,____,____,____uR/hr; ZnS____,____,____,____cpm

(Monitox)ppm: ( )____,____,____,____; ( )____,____,____,____,____;

( )____,____,____,____,____; ( )____,____,____,____,____;

(Detector Tube)(s): ( )____,____,____,____; ( )____,____,____,____;

( )____,____,____,____; ( )____,____,____,____; ( )____,____,____

Sound Levels ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; __

Illumination _____ pH _____ Other_____ ____ Other_____ ____ Other _____

Location_____

% LEL ____,____,____,____; % O_2 ____,____,____,____; PID ppm ____,____,____

FID ppm ____ ____ ____ Aerosol Monitor mg/M^3 ____,____,____

GM: Shield Probe/Thin Window - mR/hr____,____,____;cpm____,____,____

NaI____,____,____,____uR/hr; ZnS____,____,____,____cpm

(Monitox)ppm: ( )____,____,____,____; ( )____,____,____,____,____;

( )____,____,____,____,____; ( )____,____,____,____,____;

(Detector Tube)(s): ( )____,____,____,____; ( )____,____,____,____;

( )____,____,____,____; ( )____,____,____,____; ( )____,____,____

Sound Levels ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; ____dBA; __

Illumination _____ pH _____ Other_____ ____ Other_____ ____ Other _____

VII. HEALTH AND SAFETY PLAN APPROVAL/SIGN OFF FORMAT

1. Site Name _____ 2. WO# _____

Work Location Address _____
(Street Address) (City) (State) (Zip)

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

Site Safety Co-ordinator	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
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Name	Signature	Date
Name	Signature	Date

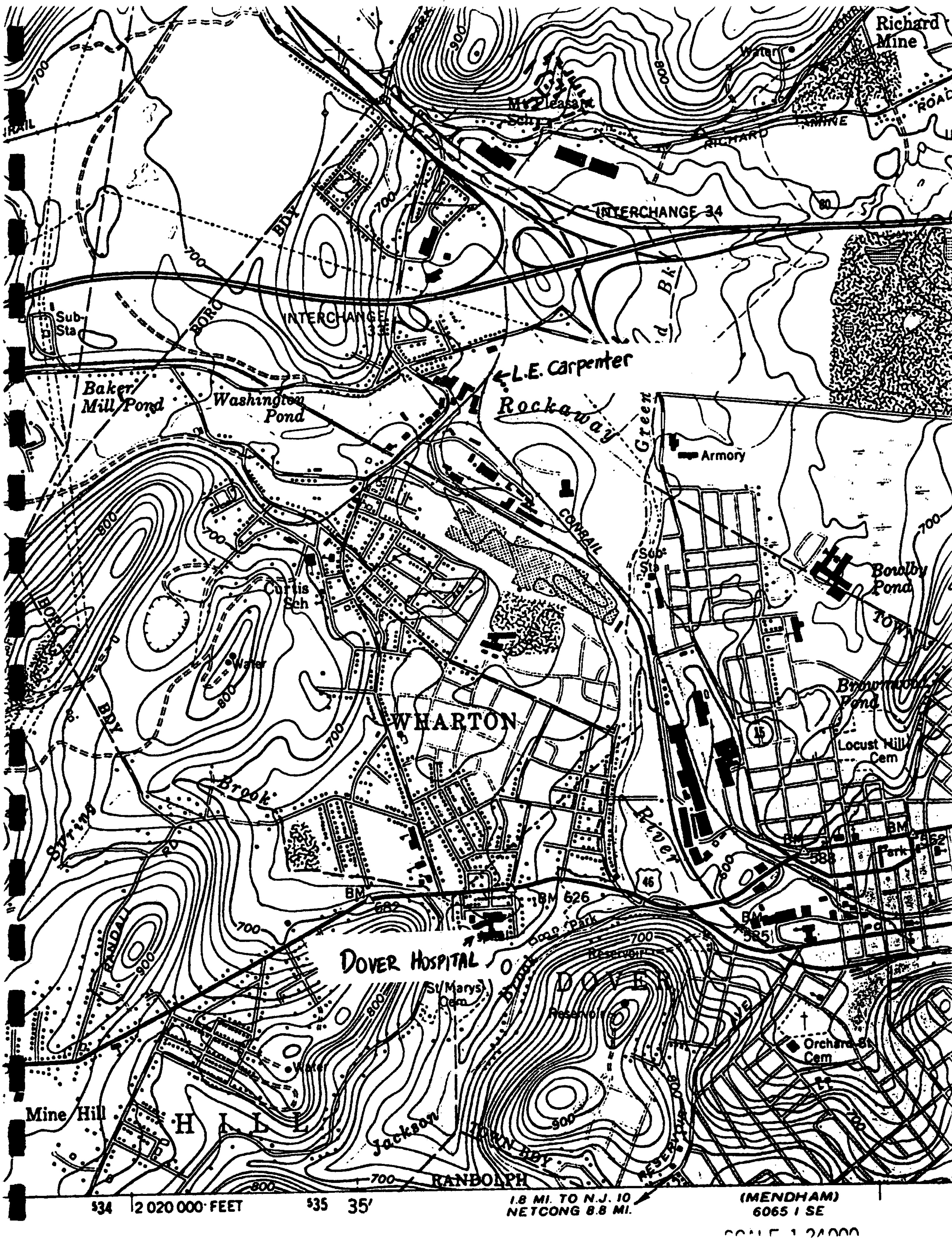
Attachment 4. LEVEL A DECONTAMINATION

STEP	FUNCTION	DESCRIPTION OF PROCESS, SOLUTION AND CONTAINERS
( )	Segregated equipment drop	
( )	Boot cover and glove wash	
( )	Boot cover and glove rinse	
( )	Tape removal - outer glove and boot	
( )	Boot cover removal	
( )	Outer glove removal	
	HOT-LINE	
( )	Suit/safety boot wash	
( )	Suit/safety boot rinse	
( )	Safety boot removal	
( )	Fully encapsulating suit/hard hat remove	
( )	SCBA backpack removal	
( )	Inner glove wash	
( )	Inner glove rinse	
( )	Face piece removal	
( )	Inner glove removal	
( )	Inner clothing removal	
	CRC/SAFE ZONE BOUNDARY	
( )	Field wash	
( )	Redress	

DISPOSAL PLAN:
END OF DAY: _____

END OF WEEK: _____

END OF PROJECT: _____



Richard Mine
Mt Pleasant Sch
RICHARD MINE ROAD
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INTERCHANGE 33
Sub-Sta
BORO BDY
←L.E. Carpenter
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Washington Pond
Rockaway
Green
Armory
CONRAIL
Subs Sta
Bowlby Pond
TOWN
Curtis Sch
Water
WHARTON
Brownwood Pond
15
Locust Hill Cem
Brook
Spring
River
46
BM 682
BM 626
BM 588
BM 585
Park
DOVER HOSPITAL
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II. Utilities

Prior to beginning work on site or in or around facilities, or buildings or other structures which could be served by or connected to utilities, a search must be conducted by the SHSC, ideally in association with someone familiar with the facility to identify any overhead, underground and in-workplace utilities such as electrical lines and appliances, gas lines, pipelines, steam lines, water lines, sewer lines, pressured air lines. The location of any utility which could pose a risk to workers must be communicated to all workers during site safety indoctrination. Utilites should be marked or access other restricted to avoid chance of accidental contact.

Utilities shall be considered "live" or active until a reliable source has documented them to be otherwise.

A. Overhead Utilities

1.0 Operations Adjacent To Overhead Power Lines

- Overhead transmission and distribution lines will be carried on towers and poles which provide safe clearance over roadways and structures.
- Clearances will be adequate for the movement of vehicles and for the operation of construction equipment.

Overhead or above ground electric lines shall be considered "live" or active until a reliable source has documented them to be otherwise.

No work place including, elevated work platforms, ladders, scaffolding, man lifts or vehicle superstructures shall be erected within 20 feet of overhead electrical lines until the line is de-energized, grounded or shielded and an electrician has certified that arcing can not occur between the work place or superstructure.

2.0 Other Overhead or In-Workplace Utilities

Workers must be instructed to use care in working under or around utilities to avoid hot surfaces, loud noises, pressured gases or air, leaking of pipelines, discharge of steam or hot liquids and must work to prevent accidental contact with or breakage.

B. Underground Utility Searches

No excavating, drilling, or boring shall be done until a thorough underground utility survey, conducted by knowledgeable persons or agencies has been made and it is found safe to begin.

Even when a search is completed, drilling, boring and excavation should commence carefully until past the depth at which such utilities are usually located.

All underground utilities shall be considered "live" or active until reliable sources demonstrate otherwise.

The SHSC is responsible for ensuring underground utility searches are performed and procedures are conformed with.

III. Trenches and Excavations

No person may enter a trench or work at the foot of the face of an excavation until **the Site Health and Safety Coordinator has inspected** and determined whether sloping or shoring is required to protect against cave-in or subsidence and the appropriate protection has been installed.

Trench and excavations must be inspected regularly to ensure that changes in temperature, precipitation, shallow ground water, over burden or nearby building weight, vibration or nearby equipment operation has caused weakening of sides, faces and floors and that protection is being maintained.

Sufficient ramps or ladders must be provided to trenches or excavations to allow quick egress. Ladders may be placed no more than 25' apart, must be secured from shifting and must extend at least three feet above the landing point. Use, construction and maintenance of ladders must conform to ladder safety requirements below.

A competent person must design and supervise construction of shoring, sheeting and/or sloping.

Material removed from a trench or excavation must be placed far enough from the edge (at least 2' feet) to prevent it's sliding into the excavation and/or from stressing the trench or excavation walls.

Trenches and excavations must be assessed by a competent person, regardless of whether personnel will be working within, when heavy equipment must work nearby, prior to and during use, to ensure the trench or excavation will support the weight of the equipment without subsiding and possibly causing the equipment to tip.

Access to trenching areas must be controlled and limited to those persons who are authorized. Prior to entering a trench or excavation, workers must notify the site supervisor, site health and safety coordinator and nearby equipment operators whose activities could affect the trench or excavation.

If trenches or excavations are near walkways or roadways, guards or warning barriers must be placed to alert pedestrians and drivers of the presence of the trench or excavation.

If possible, trenches or excavations should be covered or filled in when unattended. Otherwise, strong barriers must be placed around the trench or excavation and lighting must be provided at night if the trench or excavation is near walkways or roadways.

The Site Health and Safety Coordinator must make regular inspections of all trenches or excavations to determine if conditions, such as weather, changes in temperature, groundwater, proximity of other construction activity or soil characteristics, have altered stability and additional precautions are necessary.

IX. FIRE PROTECTION

Employees must know the location, use and limitations of all portable fire extinguishers.

Fire extinguishers must be provided on the basis of potential types of fires.

Fire extinguishers must be inspected daily by the Site Health and Safety Coordinator to ascertain that they are where they should be and are charged. A log must be kept of these inspections. At a minimum, annually, fire extinguishers must be inspected by a competent agency and dated. Fire extinguishers must have clearly indicated uses and limits information.

A fire notification or alarm system must be established and communicated to all employees.

The telephone number for the local fire response agency must be prominently posted in the work place or located where every employee has immediate access.

Smoking will be prohibited in all areas where flammable, combustible, or similar hazardous materials are stored, except in those locations specifically provided for such purpose and approved Site Health and Safety Officer.

All major motorized equipment will be equipped with a fire extinguisher of a type and make approved by the National Board of Fire Underwriters.

Fire lanes to provide access to all areas will be maintained free of obstruction.

Material storage will be arranged to minimize the spread of fire internally and to permit access for fire fighting.

Clearance will be maintained around lights and heating units to prevent ignition of combustible materials.

All sources of ignition will be prohibited in areas where flammable liquids are stored, handled, and processed. Suitable NO SMOKING signs will be posted in all such areas.

V. Hazardous Materials Storage

A. Flammable Liquids

Flammable liquids shall be stored in approved containers in flammable storage cabinets or store rooms, or 25 feet from any other storage or office area or any ignition sources.

Fuels shall be separated from oxidizers and corrosives must be separated from flammables and stored in approved cabinets or store rooms or separated by 25 feet from other storage areas or buildings.

Approved grounding and bonding procedures shall be used for transfer of flammable liquids from one container to another.

Areas where flammable liquids are stored or flammable vapors may be released must be evaluated and classed by hazard class, group and location (Division) according to the National Electric Code and electrical equipment use must conform to these codes.

All tanks, containers, and pumping equipment, portable or stationary, used for the storage or handling of flammable and combustible liquids will be listed by UL or FM or approved by the MSHA.

As a minimum, a 10 lb fire extinguisher appropriate for the type of fire which could occur must be within 50 feet of any accumulation of 5 gallons or more of flammable liquids or gases.

XIII Machinery and Mechanized Equipment Safety

A. General

Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent mechanic and certified to be in safe operating condition.

The employer will designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.

Preventative maintenance procedures recommended by the manufacturer will be followed.

Any machinery or equipment found to be unsafe will be deadlined and its use prohibited until unsafe conditions have been corrected.

Inspections or determinations of road conditions and structures will be made in advance to assure that clearances and load capacities are safe for the passing or placing of any machinery or equipment.

Machinery and mechanized equipment will be operated only by designated personnel. Equipment deficiencies observed at any time that affect their safe operation will be corrected before continuing operation.

Seats or equal protection will be provided for each person required to ride on equipment.

Getting off or on any equipment while it is in motion is prohibited.

Machinery or equipment requiring an operator will not be permitted to run unattended.

Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.

All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. Exemption:
Equipment designed to be serviced while running.

All repairs on machinery or equipment will be made at a location which will provide protection from traffic for repair persons.

Heavy machinery, equipment, or parts thereof which are suspended or held apart by slings, hoists, or jacks also will be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

MACHINERY AND MECHANIZED EQUIPMENT SAFETY (Continued)

Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

Stationary machinery and equipment will be placed on a firm foundation and secured before being operated.

All points requiring lubrication during operation will have fittings so located or guarded to be accessible without hazardous exposure.

When necessary, all mobile equipment and the operating area will be adequately illuminated while work is in progress.

Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shut-off which will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

All towing devices used on any combinations of equipment will be structurally adequate for the weight drawn and securely mounted.

Persons will not be permitted to get between a towed and towing piece of equipment until the towing equipment has been stopped.

All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.

All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked or track mechanism blocked and the parking brake set.

Lift trucks, stackers, etc., will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The ratings will not be exceeded.

Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering handwheel to spin. When permitted the steering knob will be mounted within the periphery of the wheel.

MECHANICAL AND MECHANIZED EQUIPMENT SAFETY (Continued)

All industrial trucks in use will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in ANSI B56.1, Safety Standards for Powered Industrial Trucks.

The installation of live booms on material and personnel hoists is prohibited.

The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.

Personnel will not work or pass under the buckets or booms of loaders in operation.

XV. HAND AND POWER TOOLS SAFETY

Unsafe hand tols shall not be issued or used. All hand tools will be kept in good repair and used only for the purpose for which they were designed. Wrenches with sprung jaws where slippage could occur, impact tools with mushroomed heads and wooden handled tools with cracks or splinters are examples of unsafe hand tools.

Tools having defects that will impair their strength or render them unsafe will be tagged or made inoperable and removed from service.

Guards must be in place during operatio on all power tools designed to accomodate them. Guards and safety devices must remain in place on power tools unless removed according to manufacturers instruction for maintenance by a competent person and must be replaced before use. Belts, gears, shafts, drums, fly wheels, chains or other rotating, reciprocating or moving parts exposed to employee contact or representing other hazard must be guarded.

Proper PPE must be used when operating power tools or hand tools which may produce projectiles, cuts or abrasions, dusts, fume, mists or light or which pose a risk of harm to arms, legs, or feet if dropped.

When work is being performed overhead, tools not in use will be secured or placed in holders.

Throwing tools or materials from one location to another, from one person to another, or dropping them to lower levels, is not permitted.

Only nonsparking tools will be used in locations where sources of ignition may cause a fire or explosion.

Power tools will be inspected, tested, and determined to be safe for operation prior to use. Continued periodic inspections will be made to assure safe operating condition and proper maintenance.

Electric powered tools must be approved double insulated or grounded in accordance with 1926.404.

Rotating or reciprocating portable power tools will have a constant pressure switch that will shut off the power when the tool is released by the operator. A portable power tool may have a lock-on control provided turn-off can be accomplished by a single motion of the same finger or fingers that turned it on.

Hydraulic fluid used in powered tools will retain its operating characteristics at the most extreme temperatures to which it will be exposed.

Manufacturers' safe operating pressures for hydraulic hoses, valves, pipes, filters and other fittings will not be exceeded.

All hydraulic or pneumatic tools which are used on or around energized lines or equipment will have nonconducting hoses having adequate strength for the normal operating pressures.

Loose and frayed clothing, loose long hair, dangling jewelry, rings, chains, and wrist watches will not be worn while working with any power tool or machine.

HAND AND POWER TOOLS SAFETY (Continued)

All woodworking tools and machinery will meet applicable requirements of ANSI 01.1, Safety Code for Woodworking Machinery.

Extension cords:

- Must meet UL or other rating criteria according to OSHA.
- Use will be limited to essential tasks.
- Must be tested for continuity before each use and must be connected to grounded outlets or ground fault current interrupters must be used.
- Must be inspected daily for loose insulation, broken or missing plugs, bared wires, etc.
- Grounding of outlets used for portable tools must be confirmed before use.
- Must not be allowed to become tripping or slipping hazards.
- Must not be used for lifting, tying off and shall be disconnected by pulling on the plug.

MANUAL LIFTING AND HANDLING OF HEAVY OBJECTS

HEAVY LIFTING

HAZARD

Improper lifting can result in cuts, pinches, crushing and serious back, abdomen, arm and leg muscle and joint injury.

Even "light" objects, lifted improperly, can contribute to injury causing cuts, and muscle injuries.

Cuts, Pinching and Crushing

Splinters, slivers and sharp edges on objects to be lifted can result in cuts. Insects or other biological hazards on objects can result in bites or scratches. Contamination of objects can lead to chemical or radioactive materials exposure. Heavy objects can pinch or crush fingers, toes, arms and legs between the object and nearby objects, walls, tables, counters, railings and obstructions or if dropped.

Muscle and Joint Injuries

Muscle and joint injuries occur when objects to be lifted are too heavy or awkward, in restricted access areas or are lifted improperly.

Lifting tasks, which are awkward and repetitive, involving even light objects can lead to nerve and joint damage.

RECOGNITION AND HAZARD ASSESSMENT

The need for manual lifting must be identified as a physical hazard when project tasks specifically require manual handling or use of heavy equipment is part of a job. When so identified safe lifting techniques, as follows, must be instituted.

- Plan any lifting task noting:
  - Contact hazards - Check each object before lifting for presence of splinters, slivers, sharp edges or parts, cracks and loose joints, signs of biological hazards, chemical or radioactive material contamination.
  - Weight of object - Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds respectively.
  - Size and shape of object - large and oddly shaped objects are more difficult to lift even if within safe weight limits due to imbalanced center of gravity.
  - Area in which lifting is to be done - Check for pinch points such as other objects close by and that there is room for safe lifting.
  - Conditions under which lifting is to be accomplished - Check for wet or slippery surfaces. Also consider level of protection to be used and the fact that level B or A protection may add up to 40 pounds of weight to be lifted as well as restricting range of motion and adding to area restriction by increasing bulk.
  - Route to be traveled if lifting involves carrying - Check walking and working surfaces for slip and trip hazards, note ramps, changes on level of elevation, ladders or stairways which need to be negotiated.

This system, at first feels and seems awkward. Workers must be trained and have the opportunity to use the system with lighter objects before performing heavy lifting. **For other shaped objects, the only modification needed should be hand hold position.**When t simultaneously.

Do not carry objects in a manner which obstruct vision in line of travel and of feet and footing.

Carry objects so one hand is free for travel on stairs or there is unobstructed view of footing and two hands are free for travel on ladders.

MANUAL HANDLING OF HEAVY OBJECTS

HAZARD

Manual maneuvering or handling of heavy objects without actually lifting is often required on hazardous materials, RCRA facilities and Construction sites. This often involves moving drums or other containers. Manual handling of heavy objects, even when not actually lifting, can pose all of the hazards of lifting including, cuts, pinches, bruises, crushing, muscle and joint strain, hazardous material and biological hazard contact.

RECOGNITION AND RISK ASSESSMENT

The need for manual handling of heavy objects must be addressed in the planning stages of a project HASP. Drums and other containers which must be maneuvered, for access to information or sampling locations, which are inaccessible to mechanical handling equipment, require manual handling and special precautions. When handling of heavy objects does not actually involve lifting, workers can handle heavier objects, even those weighing several hundred pounds, safely if proper techniques are used. In may instances, the procedures involve balancing and taking advantage of the shape of the object.

PREVENTION AND PROTECTION PROGRAMS

Prior to performing manual handling, it must be determined that it can be done safely and that mechanical assistance is infeasible.

Mechanical equipment or assistance such as dollies, carts, come-alongs or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping.

The minimum protection for manual handling is heavy cotton or leather gloves, Safety boots and coveralls. Metatarsel guards, chemical protective clothing and metal mesh or kevlar gloves must be used as risk of heavy items falling, hazardous materials contact and sharp edges, splinters or slivers increases.

Workers must be aware of there handling capacities and work within their capacities.

Objects to be manually handled must be checked prior to beginning movement for contact hazards and ensure handling will not trap hands, arms legs or feet between the object and other objects, walls, or railings.

Round or cylindrical objects may be rolled if rolling will not damage the structural integrity. Rolling must be controlled by chutes, tag-lines or other means of limiting acceleration. Workers must not be positioned down hill from rolled objects. Use of the legs for pushing and tag-line control of rolled objects must be stressed.

Cylindrical objects, such as drums which must remain upright, are handled manually by slightly tilting the object using the legs for control and balancing the object on the bottom edge. The handler then walks beside the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus, maintaining the balance and a steady controlled forward motion. Motion must be controlled so that stopping walking and moving the hands will stop forward motion.

Prior to moving cylindrical objects in this way, the route of travel must be walked to identify and changes of elevation, pot holes or other obstructions which could cause the object to snag, tip or get out of control.

Flat, square or rectangular objects are most easily handled using make-shift rollers or skids to break the friction with the resting surface and pushing, using the legs.

PREVENTION AND PROTECTION PROGRAMS

- Identify the potential for contact hazards on objects to be lifted before lifting. Check each object before lifting, remove any noted hazards as feasible, wear gloves (at a minimum cotton), leather or kevlar, chemical resistant, etc., depending on the nature of the hazard. Also wear safety boots, coveralls and chemical protection as appropriate.

- Avoid contact with cracks or loose joints or cover if hands or body can come into contact to reduce hazards of pinching.

- Workers must know their lifting limitations, plan lifting, keep themselves reasonably in shape and get help if uncertain that they can lift safely, and, Managers must plan and allow for safe lifting. **Safe lifting takes time.**

  - Lifting an object from the floor

    - determine that object is within safe weight limit,
    - check for contact hazards,
    - check floor for slip hazards,
    - check that there is ample space between the object to be lifted and other objects to avoid pinching or crushing,
    - check that there is ample room to squat, lift, turn or maneuver without twisting the back or other muscles or joints,
    - walk the intended route of travel to identify, and remove slip and fall hazards, if possible,
    - identify changes in elevation, steps, ramps, stairs and ladders which must be negotiated,
      - To lift objects which are square or rectangular in shape or form:
        - place one foot slightly in front of the other,

          squat as close to the object as possible,

          grasp one of the top corners away from the body and the opposite bottom corner closest to the body,

          Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight and tuck in the chin,

          Test to be sure the object is loose from floor and will lift without snagging,

          straighten the legs, keeping the back bone straight, pull the object into the body and stand up slowly and evenly without jerking or twisting,

          if turning or change of direction is required, turn with feet without twisting the torso and step in the direction to travel,

          To set an object down, reverse the sequence above being sure not to trap the bottom hand between the object and the surface on which the object is being set.

Heat Stress Prevention and Monitoring

Heat stress may occur at any time work is being performed at elevated temperatures. Wearing of chemical protective clothing, which may result in decreasing natural body ventilation, increases the risk of heat stress.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur, ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventative measures are vital.

Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventative heat stress management. In general:

- Have workers drink 16 ounces of water before beginning work, such as in the morning or after lunch. Provide disposable 4-ounce cups, and water that is maintained at 50 - 60°F. Urge workers to drink 1 to 2 of these cups of water every 20 minutes for a total of 1 to 2 gallons per day. Provide a cool area for rest breaks. Discourage the intake of coffee during working hours. Monitor for signs of heat stress.
- Acclimate workers to site work conditions by slowly increasing workloads, i.e., do not begin site work activities with extremely demanding activities.
- Provide cooling devices to aid natural body ventilation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
- In extremely hot weather, conduct field activities in the early morning and evening.
- Ensure that adequate shelter is available to protect personnel against heat as well as cold, rain, snow, etc. which can decrease physical efficiency and increase the probability of both heat and cold stress. If possible, set up the command post in the shade.
- In hot weather, rotate shifts of workers wearing impervious clothing.
- Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

The following is a discussion of specific results of heat stress:

1.0 Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of heat regulating mechanisms of the body; the individual's temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly.

- Symptoms - Red, hot, dry skin, although person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature; rapid respiratory and pulse rate; unconsciousness or coma.

- Treatment - Cool the victim quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the victim in cool, but not cold water; sponge the body with cool water or pour water on the body to reduce the temperature to a safe level (102°F). Observe the victim and obtain medical help. Do not give coffee, tea, or alcoholic beverages.

2.0 Heat Exhaustion

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. The condition is much less dangerous than heat stroke, but it nonetheless must be treated.

- Symptoms - Pale, clammy, moist skin; profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, breathing is shallow. The person may have a headache, may vomit, and may be dizzy.

- Treatment - Remove the person to a cool, air conditioned place, loosen clothing, place in a head-low position and provide bed rest. Consult physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to ensure body fluid replacement. Have patient drink 1 to 2 cups of water immediately, and every 20 minutes thereafter until symptoms subside. Total water consumption should be about 1 to 2 gallons per day.

3.0 Heat Cramps

Heat cramps are caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

- Symptoms - Acute painful spasms of voluntary muscles, e.g., abdomen and extremities.
- Treatment - Remove victim to a cool area and loosen clothing. Have patient drink 1 to 2 cups of water immediately, and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to 2 gallons per day.

4.0 Heat Rash

Heat Rash is caused by continuous exposure to heat and humid air and aggravated chafing clothes. The condition decreases ability to tolerate heat.

- Symptoms - Mild red rash, especially in areas of the body that come into contact with protective gear.
- Treatment - Decrease amount of time in protective gear and provide powder to help absorb moisture and decrease chafing.

5.0 Heat Stress Monitoring and Work Cycle Management

For strenuous field activities that are part of on-going site work activities in hot weather, the following procedures shall be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures are to be instituted when the temperature exceeds 70°F.

- Measure Heart Rate - Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beat/minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats/minute.

- Measure Body Temperature - When ambient temperatures over 90°, body temperatures should be measured with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should be shortened by 33%, while the length of the rest period stays the same. If the OT exceeds 99.6°F at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F.

- Physiological Monitoring Schedule - The following Suggested Frequency of Physiological Monitoring Schedule for Fit and Acclimated Workers shall be used as a guideline:

Temperature	(Level D)	(Level C)
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

Measure the air temperature with a standard thermometer. Estimate fraction of sunshine by judging what percent the sun is out.

100% sunshine	=	no cloud cover	=	1.0
50% sunshine	=	50% cloud cover	=	0.5
0% sunshine	=	full cloud cover	=	0.0

Adjusted temp. = actual temp. + 13 X (% sunshine factor).

The length of work period is governed by Frequency of Physiological Monitoring. The length of the rest period is governed by physiological parameters (heart rate and oral temperature). For example, if an individual's heart rate exceeds 110 beats/minute at the beginning of the rest period, that individual will remain on rest-time until his/her heart rate drops well below 110 beats/minute and their next work period (=duration of time before suggested physiological monitoring) is decreased by 33%.

Lightning

Lightning represents a hazard of electrical shock which is increased when working in flat open spaces, elevated work places ore working near tall structures or equipment such as stacks, radio towers and drill rigs. Lightning has caused of chemical storage tank fires.

RECOGNITION AND RISK ASSESSMENT

There are few actual OSHA rules to apply to the conditions covered in this procedure, however, under the "General Duty Clause", they must be addressed in safety programs.

Heat, rain, cold, snow, ice and lightning are natural phenomena which complicate work activities and add or increase risk. In the planning stages of a project and safety plan, these elements must be considered as physical hazards. Risk assessment can be accomplished in part in the development stages of a project, by listing as possible the most likely conditions i.e. rain and lightning in late spring, summer and early fall or in lightning prone areas, cold snow and ice in winter, etc. but the true determination of risk must often be made on site by the Site Health and Safety Coordinator. It is important that the SHSC is alert to these hazards, does not take them simply as a matter of fact and has time to notice them.

The few OSHA regulations which apply to inclement weather conditions include:

- Monitoring equipment and PPE must be maintained in proper working order and used according to manufacturers instructions.
- Walkways, stairs, ladders, elevated workplaces and scaffold platforms must be kept free of mud, ice and snow,
- Vehicles used in rain or cold weather must have windshield wipers and defrosters with windows kept clear of obstruction,
- Equipment requiring Roll-Over Protection must have seat belts,
- Containers of hazardous substance must be remotely opened if pressure is suspected.
- Employees must be protected from airborne contaminants using Engineering Controls such as wetting dry soil to prevent particle dispersion and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE

Additional procedures for protection during inclement weather, include:

- Required conformance with traffic laws, including maintaining speed within limits safe for weather conditions and wearing seat belts at all times.
- Using a walking stick or probe to test footing ahead of persons walking where there is standing water or snow to protect the walker against stepping into pot holes or onto puncture hazards or buried containers or other potentially structurally unsound surfaces.
- Prior to using vehicles or equipment in off-road work, walking the work area or intended travel way when puddles or snow may obscure pot holes, puncture hazards or buried containers or other potentially structurally unsound surfaces.

SUBCONTRACTOR'S HEALTH AND SAFETY AGREEMENT

I, _____, have been given authority by the Board of Directors of Aquifer Systems, Inc. (hereafter designated as Subcontractor) to agree to and implement the procedures as stated in the WESTON _____ Safety Plan. I certify that:

1. All Subcontractor personnel involved in work activities on and adjacent to the L.E. Carpenter site (hereafter referred to as Site):

   A. understand that the work is to be performed on a known hazardous materials site and that protective clothing and respiratory protective devices may be required.

   B. understand and have agreed to the provisions of the Health and Safety Plan.

   C. have been examined by a licensed physician in accordance with 29 CFR 1910. The physicians certification(s) is attached.

   D. have been trained in accordance with the applicable sections of 29 CFR 1910 and 29 CFR 1926/1910.

   E. have agreed to work under the direction of the Contractor's Site Health and Safety Coordinator or Field Safety Officer.

2. All equipment provided to Subcontractor personnel by the Subcontractor is NIOSH/OSHA approved, as appropriate, and in working condition, as specified by the manufacturer.

3. All Subcontractor respiratory and personnel protection programs that apply to this site are in compliance with 29 CFR 1910 and 29 CFR 1926/1910.

4. the Subcontractor maintains a health and safety program in accordance with applicable sections of 29 CFR 1910.

I agree to comply with the statement I have initialed below (initial only 5 or 6, not both):

5. _____ I agree that all Subcontractor personnel shall comply with the provisions of the contractor's Health and Safety Plan.

6. _____ I agree that all subcontractor personnel shall comply with the provisions of the Subcontractor's accepted Health and

Subcontractor's Health and Safety Agreement

Safety Plan, and that this plan is in compliance with the applicable sections of 29 CFR 1910 and 29 CFR 1926/1910.

I agree to be responsible for the implementation of the Health and Safety Plan in accordance with directives from the Contractor's Site Health and Safety Coordinator or Field Safety Officer.

Subcontractor's Representative: Signed_____
Date_____

Accepted for Contractor: Signed_____
Date_____

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SUBCONTRACTOR'S HEALTH AND SAFETY AGREEMENT

I,_____, have been given authority by the Board of Directors of _____(hereafter designated as Subcontractor) to agree to and implement the procedures as stated in the WESTON _____ Safety Plan. I certify that:

1. All Subcontractor personnel involved in work activities on and adjacent to the L.E. Carpenter site (hereafter referred to as Site):

   A. understand that the work is to be performed on a known hazardous materials site and that protective clothing and respiratory protective devices may be required.

   B. understand and have agreed to the provisions of the Health and Safety Plan.

   C. have been examined by a licensed physician in accordance with 29 CFR 1910. The physicians certification(s) is attached.

   D. have been trained in accordance with the applicable sections of 29 CFR 1910 and 29 CFR 1926/1910.

   E. have agreed to work under the direction of the Contractor's Site Health and Safety Coordinator or Field Safety Officer.

2. All equipment provided to Subcontractor personnel by the Subcontractor is NIOSH/OSHA approved, as appropriate, and in working condition, as specified by the manufacturer.

3. All Subcontractor respiratory and personnel protection programs that apply to this site are in compliance with 29 CFR 1910 and 29 CFR 1926/1910.

4. the Subcontractor maintains a health and safety program in accordance with applicable sections of 29 CFR 1910.

I agree to comply with the statement I have initialed below (initial only 5 or 6, not both):

5. _____ I agree that all Subcontractor personnel shall comply with the provisions of the contractor's Health and Safety Plan.

6. _____ I agree that all subcontractor personnel shall comply with the provisions of the Subcontractor's accepted Health and

Subcontractor's Health and Safety Agreement

Safety Plan, and that this plan is in compliance with the applicable sections of 29 CFR 1910 and 29 CFR 1926/1910.

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Subcontractor's Representative: Signed_____
Date_____

Accepted for Contractor: Signed_____
Date_____

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NITRIC ACID SOLUTIONS
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NITRIC ACID SOLUTIONS

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE 08/13/88
PO NBR: 13-1180
ACCT: 878660-05
INDEX: 06882240220
CAT NO: SA941

SUBSTANCE IDENTIFICATION

SUBSTANCE: NITRIC ACID SOLUTIONS CAS-NUMBER 7697-37-2

TRADE NAMES/SYNONYMS:
NITRIC ACID, 4x; NITRIC ACID, 0.4x; SO-A-94; SO-A-95; ACC40072

CHEMICAL FAMILY:
INORGANIC ACID

MOLECULAR FORMULA: H-N-03 MOL WT 63.02

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: NITRIC ACID PERCENT: 0.4-4.0

COMPONENT: WATER PERCENT: 96.0-99.6

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NITRIC ACID:
2 PPM (5 MG/M3) OSHA TWA
2 PPM ACGIH TWA; 4 PPM ACGIH STEL
2 PPM NIOSH RECOMMENDED 10 HOUR TWA

1000 POUNDS SARA SECTION 302 THRESHOLD PLANNING QUANTITY
1000 POUNDS SARA SECTION 304 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID BOILING POINT: 212 F (100 C)

MELTING POINT: 32 F (0 C) SPECIFIC GRAVITY: 1.0

VAPOR PRESSURE: 14 MMHG @ 20 C EVAPORATION RATE: (ETHER = 1) >1

PH: ACIDIC SOLUBILITY IN WATER: SOLUBLE VAPOR DENSITY: 0.7 (WATER)

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR STANDARD FOAM (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR STANDARD FOAM (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
MOVE CONTAINERS FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM STORAGE TANK ENDS (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 60).

EXTINGUISH USING AGENTS INDICATED; DO NOT USE WATER DIRECTLY ON MATERIAL. IF LARGE AMOUNTS OF COMBUSTIBLE MATERIALS ARE INVOLVED, USE WATER SPRAY OR FOG IN FLOODING AMOUNTS. USE WATER SPRAY TO ABSORB CORROSIVE VAPORS. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS; KEEP UPWIND.

TOXICITY

NITRIC ACID, FUMING:
67 PPM(NO2)/4 HOURS INHALATION-RAT LC50; CARCINOGEN STATUS: NONE.
NITRIC ACID, FUMING IS TOXIC AND IS A SEVERE SKIN, EYE AND MUCOUS MEMBRANE IRRITANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
NITRIC ACID, FUMING:
CORROSIVE/TOXIC. 100 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- MAY CAUSE COUGHING, HEADACHE, DIZZINESS, AND WEAKNESS. DELAYED SYMPTOMS MAY INCLUDE DRYNESS OF THE THROAT AND NOSE, CHEST PAIN OR TIGHTNESS, DYSPNEA, FROTHY SPUTUM, HYPOTENSTION AND CYANOSIS FOLLOWED BY PNEUMONITIS AND PULMONARY EDEMA, WHICH MAY BE FATAL. IF PATIENT RECOVERS, SCAR TISSUE MAY CAUSE STRICTURE OF THE PYLORUS OR ESOPHAGUS.
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE DENTAL EROSION FOLLOWED BY JAW NECROSIS, CHRONIC COUGH AND BRONCHITIS OR CHEMICAL

PNEUMONITIS AND GASTROINTESTINAL DISTURBANCES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
NITRIC ACID, FUMING:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH LIQUID OR CONCENTRATED VAPOR CAUSES IMMEDIATE SEVERE AND PENETRATING BURNS, STAINING THE SKIN YELLOW OR YELLOWISH-BROWN. DILUTE SOLUTIONS PRODUCE MILD IRRITATION AND HARDEN THE SKIN WITHOUT DESTROYING IT.
CHRONIC EXPOSURE- DEPENDING ON CONCENTRATION AND DURATION OF EXPOSURE, REPEATED OR PROLONGED EXPOSURE MAY CAUSE SYMPTOMS AS THOSE OF ACUTE EXPOSURE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
NITRIC ACID, FUMING:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH THE LIQUID MAY CAUSE PAIN, PHOTOPHOBIA, TEARING, EDEMA, CORNEAL ULCERATION, SEVERE BURNS, AND NECROSIS OF THE DEEPER TISSUES WITH PERMANENT DAMAGE.
CHRONIC EXPOSURE- DEPENDING ON CONCENTRATION AND DURATION OF CONTACT, REPEATED OR PROLONGED EXPOSURE MAY CAUSE SYMPTOMS AS THOSE OF ACUTE EXPOSURE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
NITRIC ACID, FUMING:
CORROSIVE.
ACUTE EXPOSURE- IMMEDIATE PAIN IN THE MOUTH, THROAT, AND STOMACH MAY BE FOLLOWED BY NAUSEA, VOMITING, DIARRHEA, HEMATEMESIS, HEMOPTYSIS, HYPOTENSION, NEPHRITIS, ALBUMINURIA, OLIGURIA, ANURIA, HEMATURIA, AND POSSIBLY CIRCULATORY COLLAPSE. ASPHYXIA IS POSSIBLE. BURNS OF THE GASTROINTESTINAL TRACT MAY BE SEVERE ENOUGH TO CAUSE PERFORATION OF THE ESOPHAGUS AND STOMACH WHICH MAY BE FOLLOWED BY MEDIASTINITIS OR PERITONITIS, INDICATED BY FEVER.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- IF VICTIM IS CONSCIOUS, GIVE HIM LARGE QUANTITIES OF WATER IMMEDIATELY TO DILUTE THE ACID. DO NOT INDUCE VOMITING. GIVE PATIENT 1 OUNCE (30 ML) OF MILK OF MAGNESIA. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
REACTS EXOTHERMICALLY WITH WATER.

INCOMPATIBILITIES:
NITRIC ACID:
ACETIC ACID: EXPLOSIVE REACTION IF NOT KEPT COLD.
ACETIC ACID AND ACETONE: EXPLOSIVE REACTION.
ACETIC ANHYDRIDE: EXPLOSIVE REACTION IF NOT KEPT COLD.
ACETONE AND SULFURIC ACID: VIOLENT DECOMPOSITION.
ACETONITRILE: EXPLOSIVE REACTION.
ACETYLENE: YIELDS TRINITROMETHANE, WHICH MELTS AT 15 C; LIQUID IS EXPLOSIVE.
ACROLEIN: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ACRYLONITRILE: EXPLOSIVE REACTION AT 90 C.
ALLYL ALCOHOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ALLYL CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
2-AMINOETHANOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
2-AMINOTHIAZOLE AND SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
AMMONIA (GAS): BURNS IN AN ATMOSPHERE OF NITRIC ACID VAPOR.
AMMONIUM HYDROXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ANILINE: IGNITES SPONTANEOUSLY.
ANION EXCHANGE RESINS: POSSIBLE VIOLENT EXOTHERMIC REACTION.
ANTIMONY: VIOLENT REACTION.
AROMATIC AMINES: POSSIBLE IGNITION REACTION.
ARSINE: EXPLOSIVE REACTION.
BENZENE: EXPLOSIVE REACTION.
BENZOTHIOPHENE DERIVATIVES: FORMATION OF POSSIBLY EXPLOSIVE COMPOUNDS.
BISMUTH (POWDERED): INTENSE EXOTHERMIC REACTION.
BORON: VIOLENT REACTION WITH INCANDESCENCE.
BORON DECAHYDRATE: EXPLOSIVE REACTION.
BORON PHOSPHIDE: IGNITION REACTION WITH POSSIBLE DEFLAGRATION.
BROMINE PENTAFLUORIDE: IGNITION REACTION.
BUTANE THIOL: VIOLENT DECOMPOSITION.
N-BUTYL MERCAPTAN: IGNITION REACTION.
N-BUTYRALDEHYDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CALCIUM HYPOPHOSPHITE: IGNITION REACTION.
CARBON (PULVERIZED): VIOLENT REACTION.
CELLULOSE: FORMS EASILY COMBUSTIBLE ETHER.
CESIUM CARBIDE: EXPLOSIVE REACTION.
CHLORINE: INCOMPATIBLE.
4-CHLORO-2-NITROANILINE: FORMS EXPLOSIVE COMPOUND.
CHLOROSULFONIC ACID: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CROTONALDEHYDE: VIOLENT DECOMPOSITION WITH IGNITION.
CRESOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CUMENE: TEMPERATURE AND PRESSURE INCREASED IN CLOSED CONTAINER.
CUPRIC NITRIDE: EXPLOSIVE REACTION.
CUPROUS NITRIDE: VIOLENT REACTION.
CYANATES: POSSIBLE EXPLOSIVE REACTION.
CYCLIC KETONES: VIOLENT REACTION.
CYCLOHEXYLAMINE: FORMS EXPLOSIVE SOLUTION.
CYCLOHEXANOL: VIOLENT REACTION.
CYCLOHEXANONE: VIOLENT REACTION.
CYCLOPENTADIENE: EXPLOSIVE REACTION.

1,2-DIAMINOETHANE BISTRIMETHYL GOLD: EXPLOSIVE REACTION.
DIBORANE: SPONTANEOUS IGNITION.
DICHLOROMETHANE: FORMS EXPLOSIVE SOLUTION.
DIENE OR ACETYLENE DERIVATIVES: POSSIBLE IGNITION REACTION.
DIETHYL ETHER: INTENSE REACTION.
DIISOPROPYL ETHER: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
DINITROTOLUENE: EXPLOSIVE REACTION.
DIPHENYL DISTIBENE: EXPLOSIVE OXIDATION.
DIPHENYL TINE: IGNITION REACTION.
2,6-DI-T-BUTYL PHENOL: FORMS EXPLOSIVE COMPOUND.
DIVINYL ETHER: POSSIBLE IGNITION REACTION.VE REACTION.
EPICHLOROHYDRIN: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ETHANOL: VIOLENT REACTION.
ETHANOL AND SILVER: FORMS EXPLOSIVE PRODUCTS.
M-ETHYL ANILINE: IGNITION REACTION.
ETHYL PHOSPHINE: IGNITION REACTION.
5-ETHYL-2-PICOLINE: FORMS EXPLOSIVE COMPOUNDS.
5-ETHYL-2-METHYL PYRIDINE: EXPLOSIVE REACTION.
ETHYLENE DIAMINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
FERROUS OXIDE (POWDERED): INTENSE EXOTHERMIC REACTION.
FLUORINE: POSSIBLE EXPLOSIVE REACTION.POSSIBLE EXPLOSION.
FURFURYL ALCOHOL: IGNITION REACTION.
GERMANIUM: VIOLENT REACTION.
GLYOXAL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
HALOGEN PHOSPHIDES: IGNITION REACTION.
HYDRAZINE: VIOLENT REACTION.
HYDRAZOIC ACID: ENERGETIC REACTION.
HYDROGEN IODIDE: IGNITION REACTION.
HYDROGEN PEROXIDE AND KETONES: FORMS EXPLOSIVE PRODUCTS.
HYDROGEN PEROXIDE AND MERCURIC OXIDE: FORMS EXPLOSIVE COMPOUNDS.
HYDROGEN PEROXIDE AND THIOUREA: FORMS EXPLOSIVE COMPOUNDS.
HYDROGEN SULFIDE: INCANDESCENT REACTION.
INDANE AND SULFURIC ACID: EXPLOSIVE REACTION.
ISOPRENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
LACTIC ACID AND HYDROGEN FLUORIDE: POSSIBLE EXPLOSIVE REACTION.
LITHIUM: IGNITION REACTION.
LITHIUM SILICIDE: INCANDESCENT REACTION.
MAGNESIUM: EXPLOSIVE REACTION.
MAGNESIUM PHOSPHIDE: INCANDESCENT REACTION.
MESITYL OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
MESITYLENE: POSSIBLE EXPLOSIVE REACTION.
METALS: VIOLENT REACTION WITH EXPLOSION OR IGNITION.
METAL CARBIDES: EXPLOSIVE OR VIOLENT REACTION.
METAL FERRICYANIDE OR FERROCYANIDE: INCOMPATIBLE.
METAL SALICYLATES: FORMS EXPLOSIVE COMPOUNDS.
METHANOL: MIXTURES OF GREATER THAN 25% ACID MAY DECOMPOSE VIOLENTLY.
4-METHYLCYCLOHEXANONE: EXPLOSIVE REACTION.
2-METHYL-5-ETHYLPYRIDINE: TEMPERATURE/PRESSURE INCREASE IN CLOSED CONTAINER.
NEODYMIUM PHOSPHIDE: VIOLENT REACTION.
NITRO AROMATIC HYDROCARBONS: FORMS HIGHLY EXPLOSIVE PRODUCTS.
NITROBENZENE: EXPLOSIVE REACTION.
NITROBENZENE AND WATER: EXPLOSIVE REACTION.
NITROMETHANE: EXPLOSIVE REACTION.
NON-METAL OXIDES (ARSINE, PHOSPHINE, TETRABORANE)- EXPLOSIVE REACTION.
OLEUM: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ORGANIC SUBSTANCES AND PERCHLORATES: POSSIBLE EXPLOSION.
ORGANIC SUBSTANCES AND SULFURIC ACID: POSSIBLE EXPLOSION.
PHENYL ACETYLENE AND 1,1-DIMETHYLHYDRAZINE: VIOLENT REACTION.

PHENYL ORTHOPHOSPHORIC ACID DISODIUM SALT: FORMS EXPLOSIVE PRODUCTS.
PHOSPHINE: VIOLENT DECOMPOSITION.
PHOSPHONIUM IODIDE: IGNITION REACTION.
PHOSPHORUS: IGNITION REACTION.
PHOSPHORUS TETRAIODIDE: VIGOROUS REACTION.
PHOSPHORUS TRICHLORIDE: EXPLOSIVE REACTION.
PHTHALIC ACID AND SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
PHTHALIC ANHYDRIDE: EXOTHERMIC REACTION AND FORMS EXPLOSIVE PRODUCTS.
POLYALKENES: INTENSE REACTION..
POLYDIBROMOSILANES: EXPLOSIVE REACTION.
POTASSIUM HYPOPHOSPHITE: EXPLOSIVE REACTION.
B-PROPIOLACTONE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
PROPYLENE OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
PYRIDINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
REDUCING AGENTS: POSSIBLE EXPLOSIVE OR IGNITION REACTION.
RUBIDIUM CARBIDE: EXPLOSIVE REACTION. POSSIBLE IGNITION REACTION.
SELENIUM: INTENSE REACTION.
SELENIUM HYDRIDE: IGNITION OR INCANDESCENT REACTION.
SELENIUM IODOPHOSPHIDE: EXPLOSIVE REACTION.
SILVER AND ETHYL ALCOHOL: EXPLOSIVE REACTION.
SODIUM: SPONTANEOUS IGNITION.
SODIUM AZIDE: ENERGETIC REACTION.
SULFAMIC ACID: VIOLENT REACTION.
STIBENE: EXPLOSIVE REACTION.
SULFUR DIOXIDE: EXPLOSIVE REACTION.
SULFUR HALIDES: VIOLENT REACTION.
SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
SULFURIC ACID AND GLYCERIDES: EXPLOSIVE REACTION.
SULFURIC ACID AND TEREPHTHALIC ACID: VIOLENT REACTION.
TERPENES: SPONTANEOUS IGNITION.
TETRABORANE: EXPLOSIVE REACTION.
TETRABORANE DECAHYDRATE: EXPLOSIVE REACTION.
THIOALDEHYDES OR THIOKETONES: VIOLENT REACTION.
THIOCYANATES: EXPLOSIVE REACTION.
THIOCYANIC ACID METAL SALTS: EXPLOSIVE REACTION.
THIOPHENES: EXPLOSIVE REACTION.
TITANIUM: FORMS EXPLOSIVE COMPOUND.
TITANIUM ALLOY: POSSIBLE EXPLOSIVE REACTION.
TITANIUM-MAGNESIUM ALLOY: POSSIBLE EXPLOSION ON IMPACT.
TOLUENE: INTENSE OR EXPLOSIVE REACTION.
TOLUENE AND SULFURIC ACID: VIOLENT DECOMPOSITION.
TOLUIDENE: IGNITION REACTION.
TRIAZINE: EXPLOSIVE REACTION.
TRICADMIUM DIPHOSPHIDE: EXPLOSIVE REACTION.
TRIETHYLGALLIUM MONOETHYL ETHER COMPLEX: IGNITION REACTION.
TRIMETHYLTRIOXANE: INTENSE REACTION.
TRITHIOACETONE: EXPLOSIVE REACTION.
UNSYMMETRICAL DIMETHYL HYDRAZINE: EXPLOSIVE REACTION.
URANIUM: EXPLOSIVE REACTION.
URANIUM ALLOY: VIOLENT REACTION.
URANIUM-NEODYMIUM ALLOY: EXPLOSIVE REACTION.
URANIUM-NEODYMIUM-ZIRCONIUM ALLOY: EXPLOSIVE REACTION.
VINYL ACETATE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
VINYLIDENE CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
P-XYLENE- INTENSE REACTION IN PRESENCE OF SULFURIC ACID.
ZINC- INCANDESCENT REACTION.
ZIRCONIUM-URANIUM ALLOYS: EXPLOSIVE REACTION.

DECOMPOSITION:
THERMAL DECOMPOSITION MAY INCLUDE HIGHLY TOXIC OXIDES OF NITROGEN, INCLUDING NITRIC OXIDE AND NITROGEN DIOXIDE, AND HYDROGEN NITRATE.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE.

STORAGE

THRESHOLD PLANNING QUANTITY (TPQ):
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION FOR THE STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE PLANNING (40 CFR 355.30).

CONDITIONS TO AVOID

MAY IGNITE OTHER COMBUSTIBLE MATERIALS (WOOD, PAPER, OIL, ETC.). REACTS VIOLENTLY WITH WATER AND FUELS. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

CONSULT NFPA PUBLICATION 43A, STORAGE OF LIQUID AND SOLID OXIDIZING MATERIALS, FOR STORAGE REQUIREMENTS.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
COVER WITH SODA ASH. SCOOP UP AND PLACE IN A SUITABLE CONTAINER.

REPORTABLE QUANTITY (RQ): 1000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS OR NIOSH CRITERIA DOCUMENTS; OR DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION.

NITRIC ACID:

125 MG/M3- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS-FLOW MODE.

250 MG/M3- ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT-OR BACK-MOUNTED CANISTER PROVIDING PROTECTION AGAINST NITRIC ACID.
ANY CHEMICAL CARTRIDGE RESPIRATOR WITH A FULL FACEPIECE AND CARTRIDGE(S) PROVIDING PROTECTION AGAINST NITRIC ACID.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT-OR BACK-MOUNTED CANISTER PROVIDING PROTECTION AGAINST NITRIC ACID.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

NOTE: ONLY NON-OXIDIZABLE SORBENTS ARE ALLOWED (NOT CHARCOAL).

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

EMERGENCY WASH FACILITIES:
WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC GROUP, INC.
CREATION DATE: 07/03/85 REVISION DATE: 06/29/88

-ADDITIONAL INFORMATION-

THE INFORMATION BELOW IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. HOWEVER, WE MAKE NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO SUCH INFORMATION, AND WE ASSUME NO LIABILITY RESULTING FROM ITS USE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION FOR THEIR PARTICULAR PURPOSES.

American Burdick & Jackson
Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET

ACETONE

emergency telephone no. 312/973-3600 (American Scientific Products)
chemtrec telephone no. 800/424-9300
information telephone no. 616/726-3171 (American Burdick & Jackson)

I. Identification

chemical name Acetone — molecular weight 58.08
chemical family Ketone — formula C_3H_6O
synonyms Dimethyl Ketone
DOT proper shipping name Acetone
DOT hazard class Flammable Liquid
DOT identification no UN1090 — CAS no 67-64-1

II. Physical and Chemical Data

boiling point, 760mm Hg 56.29°C — freezing point -94.7°C — evaporation rate (BuAc=1)ca 12
vapor pressure at 20 C 184.5 mm Hg — vapor density (air = 1) 2.0 — solubility in water @ 20°C complete
% volatiles by volume ca 100 — specific gravity (H_2O = 1) @ 20°C 0.79 — stability Stable
hazardous polymerization Not expected to occur.
appearance and odor Clear, colorless liquid with a penetrating, sweet odor.
conditions to avoid Heat, sparks, open flame, open containers, and poor ventilation.
materials to avoid Strong oxidizing agents and strong acids and bases.
hazardous decomposition products Incomplete combustion can generate carbon monoxide and other toxic vapors.

III. Fire and Explosion Hazard Data

flash point, (test method) -18°C (Tag closed cup) — auto ignition temperature 465°C
flammable limits in air % by volume: lower limit 2.6 — upper limit 12.8
unusual fire and explosion hazards Very volatile and extremely flammable. Mixtures with water can be flammable.
extinguishing media Carbon dioxide, dry chemical, alcohol foam, water mist or fog.
special fire fighting procedures Wear full protective clothing and self-contained breathing apparatus. Heat will build pressure and may rupture closed storage containers. Keep fire-exposed containers cool with water spray.

IV. Hazardous Components

	%	TLV	CAS no.
Acetone	ca 100	750 ppm	67-64-1

American Burdick & Jackson Subsidiary of American Hospital Supply Corporation 1953 South Harvey Street Muskegon MI 49442

V. Health Hazards

Occupational Exposure Limits

OSHA	8-hour PEL	-	1000 ppm
	Ceiling	-	not listed
	Peak	-	not listed
ACGIH	TLV-TWA	-	750 ppm
	TLV-STEL (15-min)	-	1000 ppm
NIOSH	TLV-TWA	-	250 ppm
	TLV-C	-	not listed

Concentration Immediately Dangerous to Health

OSHA/NIOSH	20,000 ppm

Odor Threshold

NSC	2 ppm
NIOSH	not listed

Carcinogenic, Mutagenic, Teratogenic Data

Positive mutagen (RTEC)

Primary Routes of Entry

Acetone may exert its effects through inhalation, skin absorption, and ingestion.

Industrial Exposure: Route of Exposure/Signs and Symptoms

Inhalation: Exposure can cause eye, nose, and throat irritation, headache, nausea, dizziness and narcosis.

Eye Contact: Liquid and high vapor concentration can cause irritation.

Skin Contact: Prolonged or repeated skin contact can cause irritation and dermatitis through defatting of skin.

Ingestion: Symptom information is inadequate/unknown.

Effects of Overexposure

Acetone is a mild eye and mucous membrane irritant, primary irritant, and central nervous system depressant. Acute exposure irritates the eyes and upper respiratory tract. Direct skin contact produces dermatitis, characterized by dryness and erythema. High concentrations produce narcosis and hypoglycemia.

Medical Condition Aggravated by Exposure

Preclude from exposure those individuals susceptible to dermatitis.

Emergency First Aid

Inhalation:	Immediately remove to fresh air. If not breathing, administer mouth-to-mouth rescue breathing. If there is no pulse administer cardiopulmonary resuscitation (CPR). Contact physician immediately.
Eye Contact:	Rinse with copious amounts of water for at least 15 minutes. Get emergency medical assistance.
Skin Contact:	Flush thoroughly for at least 15 minutes. Wash affected skin with soap and water. Remove contaminated clothing and shoes. Wash clothing before re-use, and discard contaminated shoes. Get emergency medical assistance.
Ingestion:	Call local Poison Control Center for assistance. Contact physician immediately. Never induce vomiting or give anything by mouth to a victim unconscious or having convulsions.

VI. Safety Measures and Equipment

Ventilation:	Adequate ventilation is required to protect personnel from exposure to chemical vapors exceeding the PEL and to minimize fire hazards. The choice of ventilation equipment, either local or general, will depend on the conditions of use, quantity of material, and other operating parameters.
Respiratory:	Use approved respirator equipment. Follow NIOSH and equipment manufacturer's recommendations to determine appropriate equipment (air-purifying, air-supplied, or self-contained breathing apparatus).
Eyes:	Safety glasses are considered minimum protection. Goggles or face shield may be necessary depending on quantity of material and conditions of use.
Skin:	Protective gloves and clothing are recommended. The choice of material must be based on chemical resistance and other user requirements. Generally, neoprene or rubber offers acceptable chemical resistance. Individuals who are acutely and specifically sensitive to acetone may require additional protective equipment.
Storage:	Acetone should be protected from temperature extremes and direct sunlight. Proper storage of acetone must be determined based on other materials stored and their hazards and potential chemical incompatibility. In general, acetone should be stored in an acceptably protected and secure flammable liquid storage room.

Other: Emergency eye wash fountains and safety showers should be available in the vicinity of any potential exposure. Ground and bond metal containers to minimize static sparks.

VII. Spill and Disposal Data

Spill Control: Protect from ignition. Wear protective clothing and use approved respirator equipment. Absorb spilled material in an absorbent recommended for solvent spills and remove to a safe location for disposal by approved methods. If released to the environment, comply with all regulatory notification requirements.

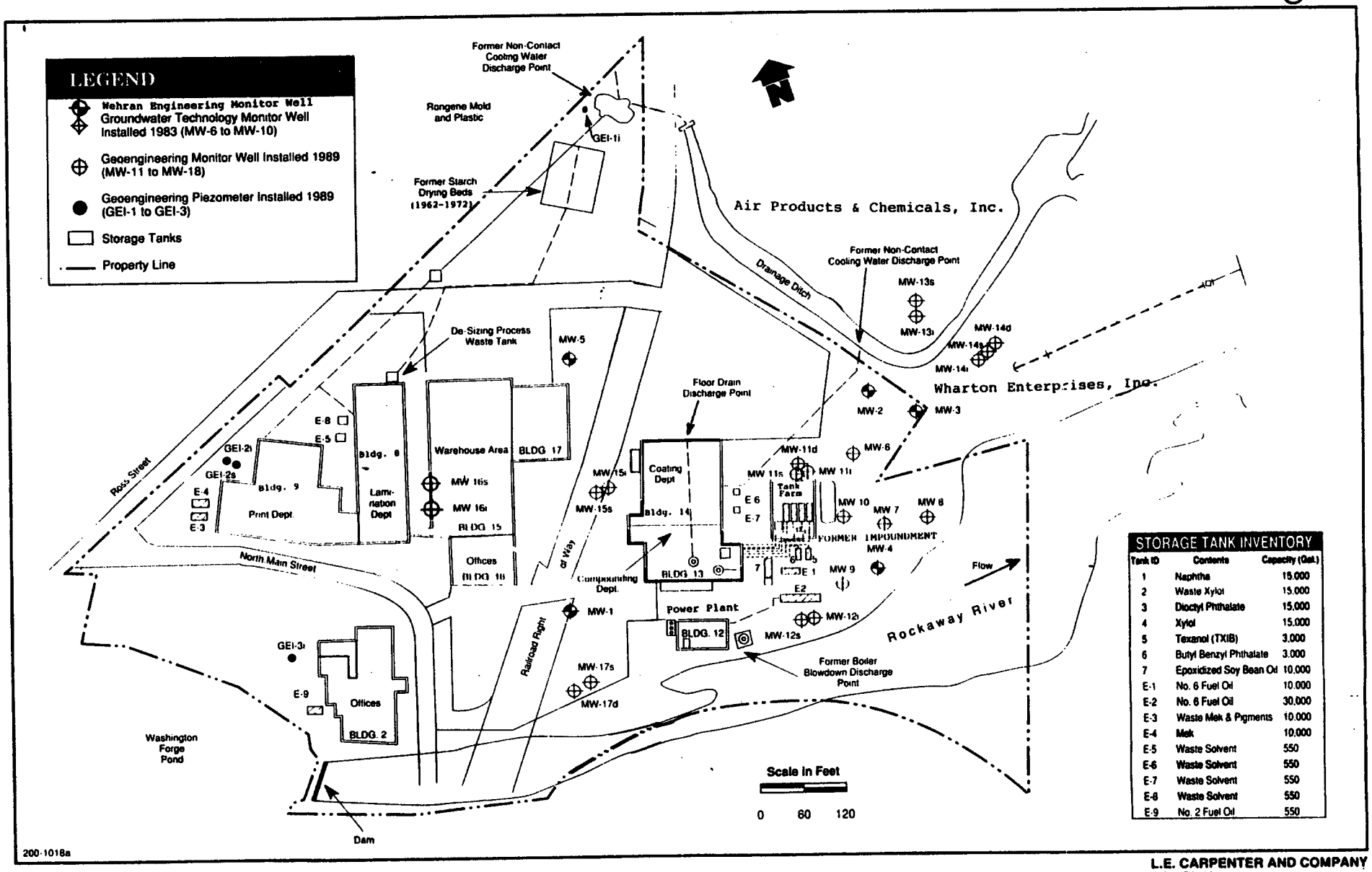
Waste Disposal: Dispose of acetone as an EPA hazardous waste. Hazardous waste numbers: U002(Ignitable); D001(Ignitable).

Revision Date: 1/85

KEY

ca	Approximately	STEL	Short Term Exposure Level
na	Not applicable	TLV	Threshold Limit Value
C	Ceiling	TWA	Time Weighted Average
PEL	Permissable Exposure Level	BuAc	Butyl Acetate

NSC National Safety Council ("Fundamentals of Industrial Hygiene", 1983)
OHS Occupational Health Services ("Hazardline")



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